



UNIVERSITY OF  
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Canadian Working Group on HIV and Rehabilitation  
Groupe de travail canadien sur le VIH et la réinsertion sociale

# **Evidence-Informed Recommendations in Rehabilitation for Older Adults Living HIV**

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## Executive Summary

**Background:** Adults aging with HIV are living with the physical, social and psychological consequences of HIV disease, long term treatment, and comorbidities associated with aging. Rehabilitation including occupational therapy, physical therapy and speech-language pathology, can assist in managing the health related challenges or disability associated with HIV and aging.

**Aim:** Our aim was to develop clinical evidence-informed recommendations on rehabilitation for older adults living with HIV.

**Methods:** We conducted a knowledge synthesis, combining research evidence specific to HIV, rehabilitation and aging, with evidence on rehabilitation interventions for common comorbidities experienced by older adults with HIV. We searched for and included: highly relevant HIV-specific research addressing rehabilitation and aging (Stream A) and high-quality evidence (systematic reviews and meta-analyses) on the effectiveness of rehabilitation interventions for comorbidities commonly experienced by older adults aging with HIV (specifically bone and joint disorders, cancer, stroke, cardiovascular disease, mental health, neurocognitive decline, cardiopulmonary disease, diabetes) (Stream B). We extracted and synthesized relevant data from included studies to draft evidence-informed recommendations on rehabilitation for older adults aging with HIV. Draft specific recommendations were refined based on people living with HIV (PLHIV) and clinicians' values and preferences, reviewed by an inter professional team for GRADE (quality) rating and revision, and then circulated to a new group of PLHIV and clinicians for external endorsement and final refinement. We then consolidated the detailed specific recommendations into overarching recommendations to broadly guide rehabilitation for older adults with HIV.

**Results:** This synthesis yielded eight overarching and 52 specific recommendations. Thirty-six specific recommendations were derived from 108 moderate or high level research evidence articles (meta-analyses and systematic reviews) that described the effectiveness of rehabilitation interventions for adults living with health conditions that may be experienced by older adults with HIV. Recommendations address specific rehabilitation interventions across eight health conditions experienced by older adults with HIV: bone and joint disorders, cancer, stroke, cardiovascular disease, mental health issues, cognitive impairments, chronic obstructive pulmonary disease, and diabetes. Sixteen specific recommendations were derived from 42 research evidence articles specific to rehabilitation for older adults with HIV. The quality of evidence from which these recommendations were derived was either low or very low, consisting primarily of narrative reviews or descriptive studies with small sample sizes. These recommendations address approaches to rehabilitation assessment and interventions, and contextual factors to consider with rehabilitation of older adults living with HIV.

Overall, we established eight overarching and 52 specific evidence-informed recommendations from a combination of low level evidence specific to HIV, aging and rehabilitation, and high level research evidence describing the effectiveness of rehabilitation interventions for comorbidities that may be experienced by older adults with HIV. PLHIV and clinician values and preferences were integral in developing these recommendations. These evidence-informed recommendations

provide a comprehensive guide for rehabilitation with older adults with HIV and those who may present with comorbidities.

### **How are the Recommendations Presented in this Document?**

The evidence-informed recommendations on rehabilitation for older adults living with HIV are presented in the form of overarching and specific detailed recommendations. Specific recommendations are presented in two streams that represent the two different bodies of research evidence from which the recommendations were derived.

#### ***Specific Recommendations***

Results for the first part of the synthesis (Stream A) include 16 recommendations derived from 42 research evidence articles specific to rehabilitation for older adults living with HIV. The level of evidence from which these recommendations were derived was either low or very low, meaning the articles were mostly narrative review articles or descriptive studies (either qualitative or quantitative) with small sample sizes. Even though a recommendation may be derived from low level evidence, it still may be highly endorsed if found to make good clinical and experiential sense from the perspective of clinicians or PLHIV.

Results for the second part of the synthesis (Stream B) include 36 recommendations derived from 108 moderate or high level research evidence articles (meta analyses and systematic reviews) describing the effectiveness of rehabilitation interventions for adults living with comorbidities that may be experienced by older adults with HIV.

All specific recommendations were reviewed and revised three times with the synthesis team that includes researchers, clinicians and people living with HIV. All specific recommendations also were circulated to 17 PLHIV and clinicians who work in HIV care for endorsement.

#### ***Overarching Recommendations***

To facilitate knowledge transfer and exchange, it became apparent that we needed to establish overarching recommendations that summarized the detailed recommendations in a condensed manner. We consolidated the 52 specific (or detailed) recommendations into eight overarching recommendations on rehabilitation for older adults living with HIV. These recommendations provide a broader and more general overview of the evidence synthesis.

### **How can the Recommendations be used?**

We present an overview of the overarching recommendations followed by the more specific (detailed) recommendations. Overarching recommendations may be used by any rehabilitation professional and other health providers who may potentially work with older adults living with HIV in their practice. Specific (or detailed) recommendations may be used by rehabilitation professionals and other health providers working with older adults living with HIV who would like more specific guidance on evidence-informed recommendations for interventions across specific comorbidities.

## Overarching recommendations in rehabilitation for older adults living with HIV

We offer eight overarching recommendations derived from the 52 specific recommendations that were developed from evidence specific to rehabilitation for older adults with HIV as well as high level evidence on rehabilitation interventions across comorbidities commonly experienced by older adults with HIV. The following recommendations serve as a general guide to providing rehabilitation care, treatment and support with older adults living with HIV.

For each general recommendation, where applicable, we refer to the specific (or detailed) recommendations from which they were derived.

**Summary Recommendation 1:** Rehabilitation professionals should be prepared to provide care to older adults with HIV who present with **complex comorbidities** affecting neurological, cardiorespiratory and musculoskeletal systems that may result in physical, mental and social health challenges. *(Original detailed recommendation #1)*

**Summary Recommendation 2:** Rehabilitation professionals should adopt an **individualized and interprofessional approach to practice** that is sensitive to the **unique values, preferences and needs of older adults with HIV**. This approach should include comprehensive assessment and treatment of **physical, neurocognitive and mental health impairments, uncertainty (or worrying about the future), functional activity limitations, and social exclusion** while considering the intersections between **personal and social attributes** and the **broader determinants of health**. *(Combination of detailed recommendations #2 – 8, 14, and 18)*

**Summary Recommendation 3:** **Multidisciplinary rehabilitation** including physical therapy, occupational therapy and speech-language pathology is strongly recommended across the **continuum of care** (acute, rehabilitation and community-based care) for older adults with HIV to address the multi-dimensional and episodic nature of disability attributed to HIV and its comorbidities such as bone and joint disorders, cancer, stroke, cardiovascular disease, mental health, cognitive impairment, chronic obstructive pulmonary disease (COPD) and diabetes. *(Combination of detailed recommendations #14, 18, 20 and 23)*

**Summary Recommendation 4:** Rehabilitation professionals should consider the role of **extrinsic contextual factors** such as stigma and ageism, HIV disclosure, and emotional and practical social supports on the health and well-being of older adults living with HIV. *(Combination of detailed recommendations #9-11)*

**Summary Recommendation 5:** Rehabilitation professionals should consider the role of **intrinsic contextual factors** such as self-management and spirituality on the health and well-being of older adults living with HIV. *(Combination of detailed recommendations #12-13)*

**Summary Recommendation 6:** A **combination of aerobic and resistive exercise** may be recommended for older adults living with HIV who are medically stable and living with comorbidities including bone and joint disorders, cancer, stroke, cardiovascular disease, stroke, mental health, cognitive impairment, chronic obstructive pulmonary disease (COPD), and diabetes. The frequency, intensity, time and type of exercise should be individually tailored to the specific goals and capacity of the individual and the specific comorbidity. *(Combination of detailed recommendations on exercise across all comorbidities)*

**Summary Recommendation 7: Cognitive rehabilitation interventions** (e.g. cognitive training, cognitive stimulation, cognitive rehabilitation) may be recommended for older adults living with HIV with mild cognitive impairment, and stroke. Inconclusive or insufficient evidence exists to support the use of **cognitive behavioural therapy** with older adults with HIV with **depression**. While cognitive rehabilitation does not appear harmful, weak evidence exists to support the use of cognitive-specific interventions to improve spatial neglect, disability, memory, and functional status for older adults who experience stroke. Rehabilitation professionals are encouraged to refer to specific clinical practice guidelines for each health condition to determine the effects of different cognitive interventions for older adults with HIV living with comorbidity. *(Combination of detailed recommendations #29, 44, 46)*

**Summary Recommendation 8:** In the absence of high level evidence on rehabilitation interventions for older adults living with HIV and comorbidities, rehabilitation professionals should refer to **existing clinical practice guidelines, systematic reviews, meta-analyses, and other forms of high level evidence for recommendations on interventions for a specific comorbidity**. These recommendations should be applied using an individualized approach incorporating the unique values, preferences, goals and needs of the individual.

# Specific recommendations in rehabilitation for older adults living with HIV

## Stream A - Recommendations Derived from Evidence Specific to Rehabilitation for Older Adults with HIV (HIV, Aging and Rehabilitation)

The following recommendations specific to HIV, rehabilitation and older adults serve as the contextual backdrop to providing rehabilitation care, treatment and support with older adults living with HIV.

We offer **16 recommendations** derived from evidence specific to rehabilitation for older adults with HIV combined with PLHIV and clinician values and preferences for clinicians to consider when working with older adults living with HIV. We include the level of evidence and citations from which each recommendation was derived. Some of the recommendations have additional explanatory notes to further explain the context and PLHIV and clinician values.

The recommendations are organized into the following six categories:

- A)** Preparedness of rehabilitation professionals
- B)** Approaches to rehabilitation assessment and treatment of older adults living with HIV
- C)** Extrinsic factors to consider with rehabilitation of older adults living with HIV
- D)** Intrinsic factors to consider with rehabilitation of older adults living with HIV
- E)** Rehabilitation approaches and
- F)** Rehabilitation interventions



Category  
A

## Preparedness of Rehabilitation Professionals

**Recommendation 1:** Rehabilitation professionals should be prepared to provide care to older adults with HIV who present with **complex comorbidities** affecting neurological, cardiorespiratory and musculoskeletal systems that may result in physical, mental and social health challenges.

**Level of Evidence:** Low

### References

Grov C, Golub SA, Parsons JT, Brennan M & Karpiak SE. Loneliness and HIV-related stigma explain depression among older HIV-positive adults. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV*. 2010; 22(5): 630-639.

Vance DE, Moneyham L, Fordham P & Struzick TC. A model of suicidal ideation in adults aging with HIV. *JANAC: Journal of the Association of Nurses in AIDS Care*. 2008; 19(5): 375-384.

Vance D E. Self-rated emotional health in adults with and without HIV. *Psychological Reports*. 2006; 98(1): 106-108.

Pitts M, Grierson J & Misson S. Growing older with HIV: a study of health, social and economic circumstances for people Living with HIV in Australia over the age of 50 years. *AIDS Patient Care & Stds*. 2005; 19(7): 460-465.

Heckman TG, Heckman BD, Kochman S, Sikkema KJ, Suhr J & Goodkin K. Psychological symptoms among persons 50 years of age and older living with HIV disease. *Aging & Mental Health*. 2002; 6(2): 121-128.

Heckman TG, Kochman A & Sikkema KJ. Depressive symptoms in older adults living with HIV disease: Application of the Chronic Illness Quality of Life Model. *Journal of Mental Health and Aging*. 2002; 8(4): 267-279.

Kalichman SC, Heckman T, Kochman A, Sikkema K & Bergholte J. Depression and thoughts of suicide among middle-aged and older persons living with HIV-AIDS. *Psychiatric Services*. 2000; 51(7): 903-907.

Heckman TG, Kochman A, Sikkema KJ & Kalichman SC. Depressive symptomatology, daily stressors, and ways of coping among middle-age and older adults living with HIV disease. *Journal of Mental Health and Aging*. 1999; 5(4): 311-322

Gutheil IA & Chichin ER. AIDS, older people, and social work. *Health & Social Work*. 1991; 16(4): 237-244.

Category  
B

Approaches to rehabilitation assessment and treatment of older adults with HIV

**Recommendation 2:** Rehabilitation professionals should adopt an individualized approach to assessment and treatment of older adults living with HIV to fully understand the **unique and complex needs of older adults with HIV**. This approach should consider the intersections between **personal and social attributes** (race, gender, sexual orientation, ethnocultural background and socioeconomic status) and the **broader determinants of health** (housing, access to health care, poverty, racism, financial supports, income support, education, work and parenting roles).

**Explanatory Notes:** Rehabilitation professionals should consider the uniqueness of HIV care provision and the need to be flexible in their approach working with older adults with HIV.

Evidence provides information about how personal attributes of older adults living with HIV including age, sexual orientation, gender, race and comorbidities (or concurrent health conditions) may further increase the complexity of HIV and aging. Consideration of the broader determinants of health within the context of the complex personal attributes are required for considering the unique needs of older adults with HIV to enhance the rehabilitation process.

**Level of Evidence:** Low

**References**

Plach SK, Stevens PE & Keigher S. Self-care of women growing older with HIV and/or AIDS. *Western Journal of Nursing Research*. 2005; 27(5): 534-553.

Emlet CA. HIV/AIDS and Aging: A Diverse Population of Vulnerable Older Adults. *Journal of Human Behavior in the Social Environment*. 2004; 9(4): 45-63.

Keigher SM, Stevens PE & Plach SK. Midlife women with HIV: health, social, and economic factors shaping their futures. *Journal of HIV/AIDS & Social Services*. 2004; 3(1): 43-58.

Emlet CA & Farkas KJ. A descriptive analysis of older adults with HIV/AIDS in California. *Health & Social Work*. 2001; 26(4): 226-234.

Heckman TG, Kochman A, Sikkema KJ, Kalichman SC, Masten J & Goodkin K. Late middle-aged and older men living with HIV/AIDS: race differences in coping, social support, and psychological distress. *Journal of the National Medical Association*. 2000; 92(9): 436-444.

## B.1) Physical and Mental Health Assessment

**Recommendation 3:** Rehabilitation professionals should consider assessing a **diversity of physical and mental health outcomes during assessment**, which include but are not limited to, disability, quality of life, stress, coping, anxiety and depression, retirement and financial issues, sexual and familial relationships, loneliness and social networks, cognition, and daily function.

**Level of Evidence:** Very low

### References

Senior K. Growing old with HIV. *The Lancet Infectious Diseases*. 2005; 5(12): 739.

## B.2) Physical health (aerobic capacity)

**Recommendation 4:** Rehabilitation professionals should assess both **physical impairment and functional activity** with older adults living with HIV (such as limitations in aerobic capacity).

**Level of Evidence:** Very low

### References

Oursler KK, Katzel LI, Smith BA, Scott WB, Russ DW & Sorkin JD. Prediction of cardiorespiratory fitness in older men infected with the human immunodeficiency virus: clinical factors and value of the six-minute walk distance. *Journal of the American Geriatrics Society*. 2009; 57(11): 2055-2061.

Oursler KK, Sorkin JD, Smith BA & Katzel LI. Reduced aerobic capacity and physical functioning in older HIV infected men. *AIDS Research & Human Retroviruses*. 2006; 22(11): 1113-1121.

## B.3 - Mental Health

**Recommendation 5:** Rehabilitation professionals should incorporate **mental health assessment and treatment** into the care of older adults with HIV as they are at risk of experiencing low mood, anxiety, depression, and suicide ideation.

**Explanatory Notes:** Rehabilitation professionals need to be aware of stressors that impact overall health, quality of life, coping, the ability to carry out daily activities, and social inclusion. Mental health interventions that enhance the coping abilities of older adults with HIV, especially those with elevated levels of psychological distress, are urgently needed. Those who are aging with HIV may be particularly vulnerable to negative affect and emotional challenges of dealing with HIV.

**Level of Evidence:** Low

## References

Grov C, Golub SA, Parsons JT, Brennan M & Karpiak SE. Loneliness and HIV-related stigma explain depression among older HIV-positive adults. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV*. 2010; 22(5): 630-639.

Vance DE, Moneyham L, Fordham P & Struzick TC. A model of suicidal ideation in adults aging with HIV. *JANAC: Journal of the Association of Nurses in AIDS Care*. 2008; 19(5): 375-384.

Vance DE. Self-rated emotional health in adults with and without HIV. *Psychological Reports*. 2006; 98(1): 106-108.

Heckman TG, Kochman A & Sikkema KJ. Depressive symptoms in older adults living with HIV disease: Application of the Chronic Illness Quality of Life Model. *Journal of Mental Health and Aging*. 2002; 8(4): 267-279.

Heckman TG, Heckman BD, Kochman A, Sikkema KJ, Suhr J & Goodkin K. Psychological symptoms among persons 50 years of age and older living with HIV disease. *Aging & Mental Health*. 2002; 6(2): 121-128.

Kalichman SC, Heckman T, Kochman A, Sikkema K & Bergholte J. Depression and thoughts of suicide among middle-aged and older persons living with HIV-AIDS. *Psychiatric Services*. 2000; 51(7): 903-907.

Heckman TG, Kochman A, Sikkema KJ & Kalichman SC. Depressive symptomatology, daily stressors, and ways of coping among middle-age and older adults living with HIV disease. *Journal of Mental Health and Aging*. 1999; 5(4): 311-322.

## B.4 - Neurocognitive Screening

**Recommendation 6:** Rehabilitation professionals should conduct regular **neurocognitive screening** with older adults living with HIV, and where indicated, conduct complete assessments to identify early signs of HIV-associated executive functioning deficits (e.g. ability to keep appointments, adhere to medication regimens, and follow-up on recommendations) and interventions to effectively prevent, reduce or compensate for cognitive impairments.

**Explanatory Notes:** Early and ongoing assessment of neurocognition among older adults living with HIV may promote early rehabilitation interventions helpful for improving cognitive function or preventing further deterioration. However, weak evidence exists for suggesting optimal methods to assess mild to moderate neurocognitive impairment and the optimal rehabilitation interventions that may address these impairments specifically to older adults living with HIV.

**Level of Evidence:** Low

## References

Vance DE & Struzick TC. Addressing risk factors of cognitive impairment in adults aging with HIV: a social work model. *Journal of Gerontological Social Work*. 2007; 49(4): 51-77.

Vance DE & Burrage Jr JW. Promoting successful cognitive aging in adults with HIV: Strategies for intervention. *Journal of Gerontological Nursing*. 2006; 32(11):34-41.

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Vance DE & Burrage Jr JW. Cognitive complaints in adults aging with HIV: a pilot study. *Physical & Occupational Therapy in Geriatrics*. 2005; 24(2): 35-51.

Neundorfer MM, Camp CJ, Lee MM, Skrajner MJ, Malone ML & Carr JR. Compensating for cognitive deficits in persons aged 50 and over with HIV/AIDS, *Journal of HIV/AIDS & Social Services*. 2004; 3(1): 79-97.

Lee MM & Camp CJ. Clinical comments. Spaced retrieval: a memory intervention for HIV+ older adults. *Clinical Gerontologist*. 2001; 22(3/4): 131-135.

### B.5) Uncertainty

**Recommendation 7:** Rehabilitation professionals should be aware of the potential impact of **uncertainty** among older adults with HIV and the psychological importance for some older adults to know the source of their symptoms (age-related versus HIV-related versus medication-related).

**Level of Evidence:** Low

#### References

Siegel K, Dean L & Schrimshaw EW. Symptom ambiguity among late-middle-aged and older adults with HIV. *Research on Aging*. 1999; 21(4): 595-618.

### B.6) Social Inclusion

**Recommendation 8:** Rehabilitation professionals should consider the risk of **social exclusion** older adults with HIV may face in relation to race, ethnicity, gender, and sexual orientation, in addition to their HIV status, in their assessment.

**Explanatory Notes:** Older adults living with HIV are at risk of social exclusion, dependent on personal and environmental factors.

**Level of Evidence:** Low

#### References

Emler CA. An examination of the social networks and social isolation in older and younger adults living with HIV/AIDS. *Health & Social Work*. 2006; 31(4): 299-308.

Category  
C

**Extrinsic Factors to consider with rehabilitation of older adults living with HIV**

**C.1) Ageism and Stigma**

**Recommendation 9:** Rehabilitation professionals should be knowledgeable of **ageism** as an added layer of stigma that may increase existing HIV stigma and homophobia experienced by older adults with HIV.

**Level of Evidence:** Low

**References**

Older HIV patients deal with the double stigma of having the disease and being old. Big worry: 'Will I get to see grandkids if I tell?'. AIDS Alert. 2007; 22(2): 16-17.

Poindexter CC. Six champions speak about being over 50 and living with HIV. Journal of HIV/AIDS & Social Services. 2004; 3(1): 99-117.

**C.2) HIV Disclosure**

**Recommendation 10:** Rehabilitation professionals should understand the implications of **HIV disclosure** among older adults with HIV, be respectful of individualized choice surrounding disclosure, the potential social, legal and financial implications of disclosure, and be prepared to discuss ways to ensure clients obtain the necessary supports surrounding disclosure.

**Explanatory Notes:** Issues surrounding disclosure will be increasingly important as older adults with HIV enter long term care environments with increasing complexities with stigma having implications for disclosure.

**Level of Evidence:** Low

**References**

Poindexter C & Shippy RA. Networks of older New Yorkers with HIV: fragility, resilience, and transformation. AIDS Patient Care & Stds. 2008; 22(9): 723-733.

Shippy RA. Taking care of each other. GMHC treatment issues : the Gay Men's Health Crisis newsletter of experimental AIDS therapies. 2007; 21(2): 7-8.

Schrimshaw EW & Siegel K. Perceived barriers to social support from family and friends among older adults with HIV/AIDS. Journal of Health Psychology. 2003; 8(6): 738-752.

### C.3) Social Support

**Recommendation 11a:** Rehabilitation professionals should be knowledgeable about the importance of social relationships and the need for **emotional and practical social support** to maximize physical, mental and psychological well-being for older adults with HIV.

**Recommendation 11b:** Rehabilitation professionals should recognize the **emotional and practical barriers to social support** that may exist within 'family' and 'support networks' among older adults with HIV.

**Recommendation 11c:** Rehabilitation professionals should recognize the **supportive obligations** that older adults with HIV may have to family, friends and fellow people with HIV and how this might impact their overall health.

**Explanatory Notes:** There may be a variable composition of 'family' and 'support networks' among older adults with HIV as HIV positive older adults may form essential networks with others living with HIV for support and grief. These networks may be simultaneously vulnerable and durable.

**Level of Evidence:** Low

#### References

Mavandadi S, Zanjani F, Ten Have TR & Oslin DW. Psychological well-being among individuals aging with HIV: the value of social relationships. *Journal of Acquired Immune Deficiency Syndromes: JAIDS*. 2009; 51(1): 91-98.

Poindexter C & Shippy RA. Networks of older New Yorkers with HIV: fragility, resilience, and transformation. *AIDS Patient Care & Stds*. 2008; 22(9): 723-733.

Shippy RA. Taking care of each other. *GMHC treatment issues : the Gay Men's Health Crisis newsletter of experimental AIDS therapies*. 2007; 21(2): 7-8.

Shippy R & Karpiak SE. Perceptions of Support Among Older Adults With HIV. *Research on Aging*. 2005; 27(3): 290-306.

Chesney MA, Chambers DB, Taylor JM & Johnson LM. Social support, distress, and well-being in older men living with HIV infection. *Journal of Acquired Immune Deficiency Syndromes: JAIDS*. 2003; 33 Suppl 2: S185-193.

Schrimshaw EW & Siegel K. Perceived barriers to social support from family and friends among older adults with HIV/AIDS. *Journal of Health Psychology*. 2003; 8(6): 738-752.

Malone MA. HIV-positive women over fifty: how they cope. *AIDS Patient Care & Stds*. 1998; 12(8): 639-643.

Category  
D

**Intrinsic Factors to consider with rehabilitation of older adults living with HIV**

**D.1) Self-Management**

**Recommendation 12:** Rehabilitation professionals should consider the role of **self-management strategies** to promote health and wellness among older adults living with HIV.

**Level of Evidence:** Low

**References**

Plach SK, Stevens PE & Sharon K. Self-care of women growing older with HIV and/or AIDS. *Western Journal of Nursing Research*. 2005; 27(5): 534-553.

Heckman TG, Kochman A, Sikkema KJ, Kalichman SC, Masten J & Goodkin K. Late middle-aged and older men living with HIV/AIDS: race differences in coping, social support, and psychological distress. *Journal of the National Medical Association*. 2000; 92(9): 436-444.

**D.2) Spirituality**

**Recommendation 13:** Rehabilitation professionals may consider the importance and role of **spirituality** in the health of older adults with HIV depending on the individual.

**Explanatory Notes:** The importance of spirituality among older adults living with HIV care may vary based on religious and ethnocultural background and may be complex, balanced with potential benefits of social support and challenges to social inclusion.

**Level of Evidence:** Very low

**References**

Hines ME. Commentary on "biopsychosocial benefits of spirituality in adults aging with HIV: implications for nursing practice and research". *New challenges for providing spiritual care in aging patients with HIV*. *Journal of Holistic Nursing*. 2008; 26(2): 126-127.

Ackerman, M. Religiosity and Biopsychosocial Outcomes in HIV: A SEM Comparison of Gender, Race, and Sexual Orientation. *Southern Online Journal of Nursing Research*. 2008; 8(4) at: [http://www.resourcenter.net/images/snrs/files/sojnr\\_articles2/Vol08Num04A.html#Ackerman.\(2008\).](http://www.resourcenter.net/images/snrs/files/sojnr_articles2/Vol08Num04A.html#Ackerman.(2008).) "2008 SNRS abstracts -- A." *Southern Online Journal of Nursing Research* 8(4): 1-1.

Vance DE & Woodley RA Strengths and distress in adults who are aging with HIV: a pilot study. *Psychological Reports*. 2005; 96(2): 383-386.

Vance DE & Robinson FP. Reconciling successful aging with HIV: a biopsychosocial overview. *Journal of HIV/AIDS & Social Services*. 2004; 3(1): 59-78.



## Category E

### Rehabilitation Approaches

#### E.1) Interprofessional Practice

**Recommendation 14:** Rehabilitation professionals should use an **interprofessional approach to practice** that is **sensitive** to the unique and individualized values and preferences of older adults with HIV while considering issues of culture, stigma and discrimination. Specifically rehabilitation professionals should **communicate** information surrounding care, treatment and education in a way that is **tailored to the specific needs** of older adults with HIV to optimize physical and mental health and well-being.

**Level of Evidence:** Low to very low

#### References

Shippy RA & Karpiak SE. The aging HIV/AIDS population: fragile social networks. *Aging & Mental Health*. 2005; 9(3): 246-254.

Hillman JL & Stricker G. Some issues in the assessment of HIV among older adult patients. *Psychotherapy*. 1998; 35 (4): 483-489.

#### E.2) Complementary and Alternative Medicine

**Recommendation 15:** Rehabilitation professionals should inquire about the nature and extent to which older adults with HIV use **complementary and alternative medicine (CAM)** and consider the potential benefits and side effects of CAM interventions.

**Explanatory Notes;** Lifestyle strategies might include use of complementary and alternative medicines and therapies. Given the high number of older adults with HIV taking complementary and alternative medicine (CAM) in combination or in lieu of antiretrovirals, it is important for rehabilitation professionals to consider the use of CAM among older adults living with HIV.

**Level of Evidence:** Low

#### References

Wutoh AK, Brown CM, Kumoji EK, Daftary MS, Jones T, Barnes NA & Powell NJ. Antiretroviral adherence and use of alternative therapies among older HIV-infected adults. *Journal of the National Medical Association*. 2001; 93(7-8): 243-250.

# Category F

## Rehabilitation Interventions

**Recommendation 16: Exercise (specifically progressive resistive exercise) may be recommended** for associated improvements in strength, body composition, and physical fitness in older adults living with HIV. Specifically, resistive exercise may be considered for use among older adults who are frail to increase muscle strength and mitigate wasting.

**Explanatory Notes:** A paucity of rehabilitation intervention evidence existed specific to older adults living with HIV. Exercise was one intervention where although there was low level evidence comprised of a prospective single group study design, this recommendation was highly GRADED by the synthesis team. Evidence on neurocognitive interventions such as space retrieval and teleconferencing support interventions also existed suggesting that group cognitive interventions focused on increasing adaptive coping and social support may help to improve the health-related quality of life of older adults living with HIV and that teleconferencing support or coping group interventions may help to improve psychological well-being, however these too were low levels of evidence and these interventions were not highly GRADED by the synthesis team. Concerns were raised in highlighting these interventions over other interventions used in clinical practice only because there was some form of evidence published in this area. As a result, we refrained from developing specific recommendations for rehabilitation interventions that did not have evidence and were not strongly graded by the team.

**Level of Evidence:** Low

### References

de Souza PML, Filho WJ, Santarem JM, da Silva AR, Li HY & Burattini MN. Progressive resistance training on elderly HIV+ patients: Does it work? *American Journal of Infectious Diseases*. 2008; 4(4): 215-219.

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Nokes KM, Chew L & Altman C. Using a telephone support group for HIV-positive persons aged 50+ to increase social support and health-related knowledge. *AIDS Patient Care & Stds*. 2003; 17(7): 345-351.

Heckman TG, Kochman A, Sikkema KJ, Kalichman SC, Masten J, Bergholte J & Catz S. A pilot coping improvement intervention for late middle-aged and older adults living with HIV/AIDS in the USA. *AIDS Care*. 2001; 13(1): 129-139.

Lee MM & Camp CJ. Clinical comments. Spaced retrieval: a memory intervention for HIV+ older adults. *Clinical Gerontologist*. 2001; 22(3/4): 131-135.

## Specific recommendations in rehabilitation for older adults living with HIV

### Stream B- Recommendations for Rehabilitation Interventions for Older Adults with HIV who may experience Common Comorbidities

The following recommendations serve as a guide for rehabilitation interventions with older adults living with HIV who may be living with common comorbidities. No guidelines exist on rehabilitation interventions specific to older adults with HIV and comorbidities. While high level evidence exists for exercise and HIV, these systematic reviews were not specifically focused with older adults with HIV.

For Stream B, we included systematic reviews or meta-analyses so the rating of the evidence was either high (systematic reviews published in the Cochrane Library) or moderate (other systematic reviews or meta-analyses not published in the Cochrane Library). However, the wording of our recommendation depended on how well or to what extent we could make the leap from the condition-specific evidence to a recommendation for rehabilitation specific to older adults living with HIV and these conditions. Hence, PLHIV and clinician values and preferences were integral to determining the strength of the recommendation, based on whether the recommendation made sense clinically and experientially for older adults living with HIV and that the intervention posed minimal risk or harm to older adults living with HIV.

We offer **36 recommendations** that include specific considerations when applying rehabilitation interventions for adults living with HIV. We then indicate the level of evidence and citations of evidence (references) from which the recommendations were derived. Given this synthesis was not specific to older adults, we also provide the age of participants represented in the evidence, to help clinicians determine the applicability of the recommendation to older adults with HIV.

The recommendations are presented based on interventions across 10 categories specific to:

**A) Older adults**

**B) HIV/AIDS**

And eight comorbidities that may be experienced by older adults with HIV:

**C) Bone and joint disorders**

**D) Cancer**

**E) Stroke**

**F) Cardiovascular disease**

**G) Mental health challenges**

**H) Cognitive impairments**

**I) Chronic Obstructive Pulmonary Disease (COPD) and**

**J) Diabetes**

## Evidence-Informed Recommendations in Rehabilitation for Older Adults Living with HIV

For each comorbidity, we provide a background on the prevalence and incidence of the condition among people living with HIV, and the nature of disability that may be experienced by adults living with HIV and these comorbidities.

Category

A

Older Adults Living with HIV

The prevalence of older adults with HIV in Canada and the United States is increasing. As of 2008, approximately 10% of Canadians living with HIV were older adults (50 years or older). In Canada, the rate of new HIV positive reports for older adults increased from 11% in 1999 to 15% in 2008 (1).

In 2005, the prevalence of older adults living with HIV, 50 years and older in the United States was 24%. Older adults accounted for 15% of all new HIV cases in 2005 (2)

Among Canadians living with HIV 50 years and older in 2005, the majority was men (86%), white (74%), 13% were Aboriginal and 6% were of African descent (1). Newly reported HIV positive cases for women ages 50 years and older increased from 11% between 1985-1996 to approximately 16% between 1997- 2008 (1).

Among adults living with HIV, 50 years and older, 18% reported having one comorbidity, 28% reported having two, and 54% reported having three or more (3). Over 50% of older adults living with HIV reported taking antiretroviral therapy (3). Long-term antiretroviral therapy may be associated with several metabolic and anatomic complications, including abnormal or degenerative conditions of the body's adipose tissue (lipodystrophy), insulin resistance, diabetes, kidney disease and an abnormal amount of lipids in the blood (dyslipidemia) (3-6).

**Disability Experienced by Older Adults with HIV**

Challenges faced by adults living with HIV, 50 years and over may include low bone mass density (which increases the risk of osteoporotic fractures), fatigue, weight loss, night sweats and diminished appetite (4, 7-10). Comorbidities such as cardiovascular disease, osteoporosis, decline of renal function, liver disease and dementia are more common among older adults living with HIV and can complicate the disease process and management (4, 11, 12).

We present three recommendations for exercise and occupational therapy for older adults living with HIV.

## A.1 – Exercise

**Recommendation 17: Regular forms of exercise** including (strength/resistance training, aerobic/cardiovascular endurance training, and balance/stability training) may be strongly recommended for older adults with HIV who are medically stable to reduce fall rates, improve functional and physical performance, improve cardiopulmonary fitness, reduce depressive symptoms, and improve mood and quality of life.

Specifically:

**Recommendation 17a: Exercise-specific interventions** involving **gait, balance, co-ordination and functional exercises, and muscle strengthening** is strongly recommended for its beneficial effect on balance.

**Recommendation 17b: Aerobic exercise** is strongly recommended to improve cardiorespiratory fitness and may also be beneficial for cognitive function specifically improvements in motor function, cognitive speed, auditory and visual attention.

**Recommendation 17c: Progressive resistive exercise** two to three times a week may be recommended to improve physical function. Clients should be monitored as evidence suggests adverse effects might occur in older people at higher risk of injury (i.e. frail or recently ill older people).

**Recommendation 17d: Home-based exercise programs** may be recommended for those who are medically stable as evidence suggests home-based exercise may be just as beneficial to centre-based exercise (rehabilitation) programs.

**Level of Evidence:** High (combination of Cochrane systematic reviews and meta-analyses - not Cochrane)

**Age of Participants in Research Evidence:** >50 years (and >60 years in majority of evidence)

### References

Liu CJ & Latham NK. Progressive resistance strength training for improving physical function in older adults. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD002759. DOI: 10.1002/14651858.CD002759.pub2.

Angevaren M, Aufdemkampe G, Verhaar HJJ, Aleman A & Vanhees L. Physical activity and enhanced fitness to improve cognitive function in older people without known cognitive impairment. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD005381. DOI: 10.1002/14651858.CD005381.pub3.

Gu MO & Conn VS. Meta-analysis of the effects of exercise interventions on functional status in older adults. *Research in Nursing & Health*. 2008; 31(6): 594–603 [Published online 10 June 2008 in Wiley InterScience]. DOI: 10.1002/nur.20290.

Baker MK, Atlantis E & Fiatarone Singh MA. Multi-modal exercise programs for older adults: systematic review. *Age and Ageing*. 2007; 36(4): 375–381. DOI:10.1093/ageing/afm054.

de Morton N, Keating JL & Jeffs K. Exercise for acutely hospitalised older medical patients. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No.: CD005955. DOI: 10.1002/14651858.CD005955.pub2.

Howe TE, Rochester L, Jackson A, Banks PMH & Blair VA. Exercise for improving balance in older people. *Cochrane Database of Systematic Reviews* 2007, Issue 4. Art. No.: CD004963. DOI: 10.1002/14651858.CD004963.pub2.

Sjosten N & Kivela SL. The effects of physical exercise on depressive symptoms among the aged: a systematic review. *International Journal of Geriatric Psychiatry*. 2006; 21(5): 410-418.

Ashworth NL, Chad KE, Harrison EL, Reeder BA & Marshall SC. Home versus center based physical activity programs in older adults. *Cochrane Database of Systematic Reviews* 2005, Issue 1. Art.No.: CD004017. DOI: 10.1002/14651858.CD004017.pub2.

Huang G, Gibson CA, Tran ZV & Osness WH. Controlled endurance exercise training and VO<sub>2</sub>max changes in older adults: a meta-analysis. *Preventive Cardiology*. 2005; 8(4): 217-225.

Arent SM, Landers DM & Etnier JL. The effects of exercise on mood in older adults: a meta-analytic review. *Journal of Aging and Physical Activity*. 2000; 8(4):407-430.

### A.2 – Rehabilitation

**Recommendation 18: Multidisciplinary forms of rehabilitation is strongly recommended for older adults with HIV who are hospitalized to promote earlier discharge directly home from hospital and reduced costs associated with hospitalization.**

**Level of Evidence:** High (combination of Cochrane systematic reviews and meta-analyses - not Cochrane)

**Age of Participants in Research Evidence:** >50 years (and >60 years in majority of evidence)

#### References

Liu CJ & Latham NK. Progressive resistance strength training for improving physical function in older adults. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD002759. DOI: 10.1002/14651858.CD002759.pub2.

Angevaren M, Aufdemkampe G, Verhaar HJJ, Aleman A & Vanhees L. Physical activity and enhanced fitness to improve cognitive function in older people without known cognitive impairment. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD005381. DOI: 10.1002/14651858.CD005381.pub3.

Gu MO & Conn VS. Meta-analysis of the effects of exercise interventions on functional status in older adults. *Research in Nursing & Health*, 2008, 31, 594–603. Published online 10 June 2008 in Wiley InterScience. DOI: 10.1002/nur.20290.

Baker MK, Atlantis E & Fiatarone Singh MA. Multi-modal exercise programs for older adults: systematic review. *Age and Ageing* 2007; 36: 375–381. doi:10.1093/ageing/afm054.

de Morton N, Keating JL & Jeffs K. Exercise for acutely hospitalised older medical patients. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No.: CD005955. DOI: 10.1002/14651858.CD005955.pub2.

Howe TE, Rochester L, Jackson A, Banks PMH & Blair VA. Exercise for improving balance in older people. *Cochrane Database of Systematic Reviews* 2007, Issue 4. Art. No.: CD004963. DOI: 10.1002/14651858.CD004963.pub2.

Sjosten N & Kivela SL. The effects of physical exercise on depressive symptoms among the aged: a systematic review. *International Journal of Geriatric Psychiatry*. 2006; 21(5): 410-418.

Ashworth NL, Chad KE, Harrison EL, Reeder BA & Marshall SC. Home versus center based physical activity programs in older adults. *Cochrane Database of Systematic Reviews* 2005, Issue 1. Art.No.: CD004017. DOI: 10.1002/14651858.CD004017.pub2.

Huang G, Gibson CA, Tran ZV & Osness WH. Controlled endurance exercise training and VO<sub>2</sub>max changes in older adults: a meta-analysis. *Preventive Cardiology*. 2005; 8(4): 217-225.

Arent S M, Landers D M & Etnier J L. The effects of exercise on mood in older adults: a meta-analytic review. *Journal of Aging and Physical Activity*. 2000; 8:407-430.

### A.3 – Occupational Therapy

**Recommendation 19: Occupational therapy** may be an important component of rehabilitation for older adults living with HIV with functional impairments and is strongly recommended for elderly community dwellers, specifically for advising on adaptive devices; mobility devices; energy conservation; cognitive training; training of skills to use adaptive devices to enhance functional ability, and to enhance social participation and quality of life.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** >60 years

#### Reference

Steultjens EM, Dekker J, Bouter LM, Jellema S, Bakker EB & van den Ende CH. Occupational therapy for community dwelling elderly people: a systematic review. *Age & Ageing*. 2004; 33(5): 453-460.



Category  
B

HIV/AIDS

We present one recommendation for exercise specific to older adults living with HIV.

**Recommendation 20: Aerobic and resistive exercise** may be recommended for at least 20 minutes at least 3 times per week for at least 5 weeks for older adults living with HIV who are medically stable with the potential to maintain or enhance outcomes of cardiopulmonary fitness, weight and body composition, strength, and quality of life.

**Explanatory Notes:** Although this recommendation was derived from high level evidence on HIV and exercise, the evidence is not specific to older adults with HIV. Clinicians are encouraged to use this recommendation in combination with the exercise recommendation #16 that was derived from lower level evidence, but specifically to older adults with HIV.

**Level of Evidence:** High (Cochrane systematic reviews)

**Age of Participants in Research Evidence:** Age range 18-66 years

**References**

O'Brien K, Nixon S, Tynan AM & Glazier R. Aerobic exercise interventions for adults living with HIV/AIDS. *Cochrane Database of Systematic Reviews* 2010, Issue 8. Art. No.: CD001796. DOI: 10.1002/14651858.CD001796.pub3.

O'Brien K, Tynan AM, Nixon S & Glazier RH. Effects of progressive resistive exercise in adults living with HIV/AIDS: systematic review and meta-analysis of randomized trials. *AIDS Care*. 2008; 20(6): 631-653. Available from: <http://dx.doi.org/10.1080/09540120701661708>.

## Category C

### Bone and Joint Disorders

The prevalence of low bone mineral density (BMD) among older adults living with HIV ranges from 27%-39%; and the prevalence of osteoporosis is 15% - 16% which is 4 times greater than adults without HIV. Prevalence rates for osteopenia are 20-52% and 4% for osteonecrosis (7, 13-16).

HIV infection has been independently linked to decreased BMD among men and women (10, 13). Men ages 50 years and older in general have low BMD, but this levels of BMD are lower among older men living with HIV compared to men in the same age group living without HIV (10). The prevalence of low peak bone mass are higher among women living with HIV compared to women who are not living with HIV, younger in age, have a moderate to high body weight, no history of bone fractures and who has or is currently using estrogen (13).

Lifestyle factors among people living with HIV associated with low peak bone mass include cigarette smoking (10, 17). With an increasing prevalence of smoking among people living with HIV, the prevalence of osteoporosis may increase among this population (4, 18).

Ethnicity is a genetic factor strongly associated with BMD (13). People of African descent have higher BMD and a lower risk of developing osteoporosis compared to the rest of the population, but the presence of an HIV infection can reduce BMD and increase risk of osteoporotic fractures regardless of ethnicity (13).

Rheumatic Disorders are medical problems affecting the joints and connective tissue (19). They include spondyloarthropathic arthritis, also known as Reiter's syndrome which has a prevalence rate ranging from 5-10% among adults with HIV (19). The prevalence rate for psoriatic arthritis is 1-32% among adults living with HIV (19).

#### Disability Experienced by Adults with Bone and Joint Disorders

Challenges faced by adults living with HIV with bone and joint disorders include prolonged periods of immobility (decreased activity levels), increased bone loss, reduced weight bearing, decreased joint range-of-motion, and pain in joints and areas closest to joint (13, 16, 19).

Low BMD in the femoral neck and lumbar spine increases the risk of osteoporotic fractures for women living with HIV (13). Older men living with HIV with low BMD have increased chances of fractures and hospitalization from fracture (7, 10). Fractures can lead to activity limitations (such as decreased mobility) as well as social participation restrictions.

We present four recommendations for exercise, rehabilitation and self-management interventions for older adults living with HIV and bone and joint disorders.

## C.1 – Exercise

**Recommendation 21a: Supervised exercise** sessions should be recommended to older adults living with HIV with knee and/or hip osteoarthritis (OA) who are medically stable to improve pain and physical function.

**Explanatory Notes:** Evidence more strongly suggests improvements with knee osteoarthritis (OA) rather than hip OA. Exercise programs that involve more than 12 directly supervised sessions may be associated with greater improvements in knee pain and physical function. While this evidence was not specific to older adults with knee or hip OA, it did include older adults with OA in the systematic review.

**Recommendation 21b: A combination of low impact exercise in the form of jogging, stair climbing and walking, combined with high-magnitude resistance training** should be recommended for older adults with HIV to preserve bone mineral density.

**Explanatory Notes:** Evidence is specific to postmenopausal women, but there is no reason that men may not benefit from these exercise interventions as well.

**Level of Evidence:** High (knee OA) to moderate (hip OA) (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** >50 years

### References

Fransen M & McConnell S. Exercise for osteoarthritis of the knee. *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD004376. DOI: 10.1002/14651858.CD004376.pub2. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004376.pub2/pdf>

Fransen M & McConnell S, Hernandez-Molina G, Reichenbach S. Exercise for osteoarthritis of the hip. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD007912. DOI: 10.1002/14651858.CD007912. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007912/full>

Martyn-St James M & Carroll S. A meta-analysis of impact exercise on postmenopausal bone loss: The case for mixed loading exercise programmes. *Br J Sports Med.* 2009; 43(12): 898-908. Originally published online November 3, 2008. DOI: 10.1136/bjsm.2008.052704. Available from: <http://bjsportmed.com/content/43/12/898.abstract>.

**Recommendation 22: Balance and strengthening exercises** should be part of an overall exercise program to decrease falls and risk of fall-related fractures for older adults with HIV and low bone mineral density (BMD).

**Explanatory Notes:** Balance and strengthening exercises are important for overall aging and older adults but particularly for older adults with HIV who may have nutritional challenges and issues with muscle-wasting. Balance training is also particularly important for older adults with HIV who may have peripheral neuropathy resulting in balance impairments placing them at increased risk for falls.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** >50 years

## References

de Kam D, Smulders E, Weerdesteyn V & Smits-Engelsman BC. Exercise interventions to reduce fall-related fractures and their risk factors in individuals with low bone density: a systematic review of randomized controlled trials. *Osteoporosis International*. 2009; 20(12): 2111-212. DOI: 10.1007/s00198-009-0938-6.

## C.2 - Rehabilitation

**Recommendation 23: Multidisciplinary rehabilitation teams** comprised of an occupational therapy (OT) and physical therapy (PT) across the **continuum of care** should be recommended for older adults with HIV who sustain a hip fracture. Specifically, **inpatient geriatric rehabilitation programs** are strongly recommended and may be an ideal intervention as they have the potential to reduce nursing home admission, mortality and improve functional status.

**Explanatory Notes:** Weak evidence exists on the effect of rehabilitation interventions for older adults post hip fracture on physical, psychosocial outcomes, mortality and length of stay. Limitations in the evidence are related to the large variability in interventions and outcomes assessed.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** >50 years

## References

Bachmann S, Finger C, Huss A, Egger M, Stuck AE & Clough-Gorr KM. Inpatient rehabilitation specifically designed for geriatric patients: systematic review and meta-analysis of randomised controlled trials. *BMJ (Clinical research ed.)*. 2010; 340: c1718. DOI: <http://dx.doi.org/10.1136/bmj.c1718>.

Crotty M, Unroe K, Cameron ID, Miller M, Ramirez G & Couzner L. Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people. *Cochrane database of systematic reviews* 2010, DOI: 10.1002/14651858.CD007624.pub3. Available from: <http://summaries.cochrane.org/CD007624/rehabilitation-interventions-for-improving-physical-and-psychosocial-functioning-after-hip-fracture-in-older-people>

Chudyk AM, Jutai JW, Petrella RJ & Speechley M. Systematic Review of Hip Fracture Rehabilitation Practices in the Elderly. *Archives of Physical Medicine and Rehabilitation*. 2009; 90(2): 246-262.

Handoll HHG, Cameron ID, Mak JCS, & Finnegan TP. Multidisciplinary rehabilitation for older people with hip fractures. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD007125. DOI: 10.1002/14651858.CD007125.pub2. Available from: <http://summaries.cochrane.org/CD007125/multidisciplinary-rehabilitation-of-older-patients-with-hip-fractures>.

Halbert J, Crotty M, Whitehead C, Cameron I, Kurrle S, Graham S, Handoll H, Finnegan T, Jones T, Foley A & Shanahan M. Multi-disciplinary rehabilitation after hip fracture is associated with improved outcome: A systematic review. *Journal of Rehabilitation Medicine*. 2007; 39(7): 507-512.

Handoll HH, Sherrington C & Parker MJ. Mobilisation strategies after hip fracture surgery in adults. *Cochrane database of systematic reviews* 2004, Issue 1: 1-94. DOI: 10.1002/14651858.CD001704.pub3. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001704.pub4/full>.

### C.3 – Self-Management Programs

**Recommendation 24: Self-management** programs may be considered as a component of a rehabilitation program to address disability and pain for older adults living with HIV and arthritis.

**Explanatory Notes:** Self-management strategies may be particularly useful in the context of HIV whereby there may be limitations in access to rehabilitation services for older adults with HIV.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** Mean age 61 years

#### Reference

Warsi A, LaValley MP, Wang PS, Avorn J & Solomon DH. Arthritis self-management education programs: A meta-analysis of the effect on pain and disability. *Arthritis and Rheumatism*. 2003; 48(8): 2207-2213.

## Category

### D

## Cancer

Since the introduction of combination antiretroviral therapy the incidence of AIDS associated cancers such as Kaposi's sarcoma (KS) and Non-Hodgkin's Lymphoma (NHL) have declined (20).

However, incidence rates of non-AIDS associated cancers among adults living with HIV have increased, including anal cancer (43%), vaginal cancer (21%), and cervical cancer (19%) Hodgkin Lymphoma (15%), liver cancer (8%), lung cancer (3%), and melanoma cancers (3%) (20, 21). The pattern of breast cancer in adults living with HIV is unusual, as only a few cases have been reported (22, 23). Breast cancer is the most common form of cancer among women in the general population. While no increased incidence of breast cancer in women living with HIV has been identified, this form of cancer is becoming an increasingly important comorbidity for women living with HIV (22, 24).

Current evidence suggests low rates of screening for non-AIDS associated cancers among people living with HIV (24, 25).

### Disability Experienced by Adults living with Cancer

Non-AIDS associated cancers can cause fatigue, weight loss, night sweats and diminished appetite (9). Symptoms of Non AIDS-associated cancers are often similar to symptoms of HIV/AIDS (25).

We present five recommendations pertaining to exercise for older adults living with HIV and general, lung, breast or metastatic cancer.

## Di) - Cancer (General)

### Di-1 – Exercise

**Recommendation 25:** A combination of aerobic and resistance exercise at moderate intensity may be recommended for older adults living with HIV and cancer to reduce cancer-related fatigue during and after treatment for cancer. Any exercise intervention should be individualized based on the targeted health outcome and cancer type.

**Level of Evidence:** High (Cochrane systematic review)

**Age of Participants in Research Evidence:** Mean age majority >50 years

### References

Brown J, Huedo-Medina TB, Pescatello LS, Pescatello SM, Ferrer RA & Johnson BT. Efficacy of Exercise Interventions in Modulating Cancer-Related Fatigue among Adult Cancer Survivors: A Meta-Analysis. *Cancer Epidemiol Biomarkers Prev.* 2011; 20:123-133. DOI:10.1158/1055-9965.EPI-10-0988.

Velthuis MJ, Agasi-Idenburg SC, Aufdemkampe G & Wittink HM. The Effect of Physical Exercise on Cancer-related Fatigue during Cancer Treatment: a Meta-analysis of Randomised Controlled Trials. *Clinical Oncology*. 2010; 22(3) 208–221. DOI: 10.1016/j.clon.2009.12.005.

Cramp F & Daniel J. Exercise for the management of cancer-related fatigue in adults. *Cochrane Database of Systematic Reviews* 2008, Issue 2. Art. No.: CD006145. DOI: 10.1002/14651858.CD006145.pub2. Available from: <http://summaries.cochrane.org/CD006145/the-effect-of-exercise-on-fatigue-associated-with-cancer>.

**Recommendation 26:** A combination of aerobic and resistive exercise at least twice a week for at least 2 weeks at 50-90% maximum oxygen capacity (VO<sub>2</sub>max) intensity is safe and may be recommended for older adults living with cancer for improvements in physiological measures, symptoms, physical and psychosocial functioning of patients and health-related quality of life. Positive effects of exercise may vary as a function of the type of cancer; the stage of disease; the medical treatment; the nature, intensity, and duration of the exercise program; and the lifestyle of the individual.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** Age ranged 16-71 years

### References

Spence RR, Heesch KC & Brown WJ. Exercise and cancer rehabilitation: A systematic review. *Cancer Treatment Reviews*. 2010; 36(2) 185–194. DOI: 10.1016/j.ctrv.2009.11.003.

Knols R, Aaronson NK, Uebelhart D, Franssen J & Aufdemkampe D. Physical Exercise in Cancer Patients During and After Medical Treatment: A Systematic Review of Randomized and Controlled Clinical Trials. *J Clin Oncol*. 2005; 23(16): 3830-3842.

## Dii) Lung Cancer

### Dii-1- Exercise

**Recommendation 27:** Exercise may be beneficial for self-empowerment and should be recommended for older adults living with HIV who are also living with **lung cancer** who are medically stable.

**Explanatory Notes:** Weak evidence exists on the effect of exercise among adults with lung cancer. Given the increasing prevalence of lung cancer as a non-AIDS related cancer for people living with HIV, the role for exercise may be particularly important with respect to this recommendation. Furthermore, rehabilitation professionals may want to consider their role in addressing smoking cessation among their clients living with HIV.

**Level of Evidence:** High (Cochrane systematic review)

**Age of Participants in Research Evidence:** Mean age >50 years

## Reference

Solà I, Thompson EM, Subirana Casacuberta M, Lopez C & Pascual A. Non-invasive interventions for improving well-being and quality of life in patients with lung cancer. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD004282. DOI: 10.1002/14651858.CD004282.pub2.

## Diii) Breast Cancer

### Diii-1- Exercise

**Recommendation 28a:** Supervised aerobic exercise programs should be included during breast cancer treatment for the management of cancer related fatigue for older women living with HIV and breast cancer who are medically stable.

**Recommendation 28b:** A **combination of aerobic and resistive exercise** at least 3 times per week for at least 6 weeks, 30-40 minutes per session, at moderate intensity (e.g. rate of perceived exertion 11-13 out of 20) appears to be safe and may be recommended for older women living with HIV undergoing or who have undergone treatment for **breast cancer** and who are medically stable for potential improvements in cardiopulmonary fitness, physical functioning, fatigue, and body composition and quality of life.

**Level of Evidence** - High (Cochrane systematic review)

**Age of Participants in Research Evidence:** Mean age majority >50 years

## References

Brown J, Huedo-Medina TB, Pescatello LS, Pescatello SM, Ferrer RA & Johnson BT. Efficacy of Exercise Interventions in Modulating Cancer-Related Fatigue among Adult Cancer Survivors: A Meta-Analysis. *Cancer Epidemiol Biomarkers Prev.* 2011; 20: 123-133. DOI:10.1158/1055-9965.EPI-10-0988

Chan DNS, Lui LYY & So WK. Effectiveness of exercise programmes on shoulder mobility and lymphoedema after axillary lymph node dissection for breast cancer: systematic review. *Journal of Advanced Nursing.* 2010; 66(9): 1902-1914.

McNeely ML, Campbell K, Ospina M, Rowe BH, Dabbs K, Klassen TP, Mackey J & Courneya K. Exercise interventions for upper-limb dysfunction due to breast cancer treatment. *Cochrane Database of Systematic Reviews* 2010, Issue 6. Art. No.: CD005211. DOI: 10.1002/14651858.CD005211.pub2.

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Kim CJ, Kang DH & Park JW. A Meta-Analysis of Aerobic Exercise Interventions for Women With Breast Cancer. *Western Journal of Nursing Research.* 2009; 31(4): 437-461.



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Brockow T, Markes M & Resch KL. Exercise for women receiving adjuvant therapy for breast cancer. Cochrane Database of Systematic Reviews 2006, Issue 4. Art. No.: CD005001. DOI: 10.1002/14651858.CD005001.pub2.

Ingram C, Courneya KS & Kingston D. The Effects of Exercise on Body Weight and Composition in Breast Cancer Survivors: An Integrative Systematic Review. *Oncology Nursing Forum*. 2006; 33(5): 937.

McNeely ML, Campbell K, Ospina M, Rowe BH, Dabbs K, Klassen TP, Mackey J & Courneya K. Exercise interventions for upper-limb dysfunction due to breast cancer treatment. *CMAJ*. 2006; 175(1):34-41. DOI:10.1503/cmaj.051073.

## Category E

### Stroke

The prevalence of stroke among adults living with HIV between 2000 and 2006 is 11%; these rates are much higher among older women living with HIV (14%) compared to older men living with HIV (10%) (3).

The incidence of stroke among adults living with HIV has increased with the introduction of combination antiretroviral therapy; adults living with HIV are more at risk of stroke with increased age and length of time using antiretroviral therapy (26).

The incidence rate for ischemic stroke among adults living with HIV has increased to 0.2% in 2006, compared to 0.1% in 1997 (26-28). HIV/AIDS also increases the risk of hemorrhagic stroke, but the risks are higher among the younger adults living with HIV compared to older adults living with HIV (27).

#### Disability Experienced by Adults with Stroke

Stroke can result in hospitalization and increased risk for developing opportunistic infections (27, 28). The occurrence of stroke may result in a combination of physical, cognitive, speech and mental health impairments, activity limitations, and social participation restrictions (29).

Injuries that can be sustained from the occurrence of a stroke include pressure sores, and pain in shoulder and other areas. Injuries from falls can also occur (29). Psychological challenges faced as a result of stroke include depression, anxiety, emotionalism, and confusion (29).

We present eight recommendations for rehabilitation, cognitive rehabilitation, exercise and therapeutic modality interventions for adults with living with HIV and stroke.

#### E.1 – Cognitive Rehabilitation

**Recommendation 29a:** Inconclusive or insufficient evidence exists to derive recommendations for **cognitive rehabilitation** interventions for older adults with HIV and stroke. While cognitive rehabilitation does not appear harmful, weak evidence exists to support the use of cognitive-specific interventions to improve spatial neglect, disability, memory, and functional status for older adults who experience stroke.

**Recommendation 29b:** Rehabilitation professionals should implement specific task oriented training with older adults living with HIV and stroke as this approach is key to retraining skill specific tasks related to function.

**Explanatory Notes:** Despite the lack of strong evidence supporting cognitive rehabilitation in stroke, neurocognitive impairments are a major concern for the aging people living with HIV/AIDS (PLHIV) population. There may be specific considerations for older adults with HIV with pre-existing neurocognitive impairments and stroke. From a rehabilitation perspective it will be important to obtain a clear baseline to determine what neurocognitive issues are specific to stroke.

## Evidence-Informed Recommendations in Rehabilitation for Older Adults Living with HIV

**Level of Evidence:** Moderate (systematic review but not Cochrane) to High (Cochrane review)

**Age of Participants in Research Evidence:** Majority of mean age >50 years [#730 younger participants]

### References

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Bowen A & Lincoln N. Cognitive rehabilitation for spatial neglect following stroke. *Cochrane Database of Systematic Reviews* 2007, Issue 2. Art. No.: CD003586. DOI: 10.1002/14651858.CD003586.pub2.

dasNair R & Lincoln N. Cognitive rehabilitation for memory deficits following stroke. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD002293. DOI: 10.1002/14651858.CD002293.pub2.

Park NW & Ingles JL. Effectiveness of attention rehabilitation after an acquired brain injury: a meta-analysis. *Neuropsychology*. 2001; 15(2): 199-210.

## E.2 – Rehabilitation

**Recommendation 30: Stroke rehabilitation for older adults with HIV should be multi-disciplinary** including occupational therapy, physical therapy, and speech-language pathology to improve the ability to undertake personal activities of daily living and reduce risk of deterioration in ability. Stroke rehabilitation may include the following components: therapeutic exercise, task-oriented training, gait-oriented training, balance training, strength training, wheelchair mobility, home modification, cognitive adaptation, and treatment of shoulder subluxation for those who experience a **sub-acute or post-acute stroke (within 1 year)**.

Specifically:

**Recommendation 30a: Repetitive, task-related training** in rehabilitation for lower limbs should be recommended to enhance functional activity, walking distance; walking speed; sit-to-stand, activities of daily living; measures of walking ability, and global motor function.

**Recommendation 30b: Very early mobilization** should be promoted for older adults with HIV to enhance earlier independent mobility.

**Recommendation 30c: Passive sensory training** (cutaneous electrical stimulation) may be recommended to improve hand function and dexterity in older adults living with HIV with stroke whereas evidence supporting improvements in spasticity and muscle strength is less convincing. Caution should be taken for this intervention for individuals with peripheral neuropathy due to altered sensation.

**Recommendation 30d: Task-oriented circuit class training** should be recommended to enhance gait and gait-related activities as evidence demonstrates this intervention is effective in improving walking ability, walking speed and balance however rehabilitation professionals should be aware of the potential for falls during any rehabilitation sessions and should put strategies in place to prevent against falls.

**Recommendation 30e: Strength training** should be recommended post stroke as it is not associated with increases in spasticity.

**Level of Evidence:** High (CPGs and Cochrane systematic reviews) and Moderate (systematic review but not Cochrane) to High (Cochrane review)

**Age of Participants in Research Evidence:** Majority of studies mean age > 50 years [2 studies had no age info] and Studies with participant >18 years

### References

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## Evidence-Informed Recommendations in Rehabilitation for Older Adults Living with HIV

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Moseley AM, Stark A, Cameron ID & Pollock A. Treadmill training and body weight support for walking after stroke. *Cochrane Database of Systematic Reviews* 2005, Issue 4. Art. No.: CD002840. DOI: 10.1002/14651858.CD002840.pub2.

Kwakkel G, van Peppen R, Wagenaar RC, Wood Dauphinee S, Richards C, Ashburn A, Miller K, Lincoln N, Partridge C, Wellwood I & Langhorne P. Effects of augmented exercise therapy time after stroke: A meta-analysis. *Stroke.* 2004; 35(11):2529-2539. Originally published online October 7, 2004. DOI: 10.1161/01.STR.0000143153.76460.7d.

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Van Peppen RP, Kwakkel G, Wood-Dauphinee S, Hendriks HJ, Van der Wees PJ & Dekker J. The impact of physical therapy on functional outcomes after stroke: what's the evidence? *Clinical Rehabilitation.* 2004; 18(8): 833-862.

### E.3 - Rehabilitation (Occupational Therapy)

**Recommendation 31: Occupational therapy should be recommended** as a component of rehabilitation for older adults living with HIV with stroke as interventions targeted towards personal activities of daily living may increase activities of daily living (ADLs) and reduce mortality, deterioration and dependency.

**Level of Evidence:** Moderate (meta-analysis and systematic reviews but not Cochrane)

**Age of Participants in Research Evidence:** Mean age 71 years

## References

Legg L, Drummond A, Leonardi-Bee J, Gladman JRF, Corr S, Donkervoort M, Edmans J, Gilbertson L, Jongbloed L, Logan P, Sackley C, Walker M & Langhorne P. Occupational therapy for patients with problems in personal activities of daily living after stroke: systematic review of randomised trials. *BMJ*. 2007; 335(7626): 922.

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## E.4- Rehabilitation (Physical Therapy)

**Recommendation 32: Physiotherapy** comprised of a combination of interventions should be recommended for the recovery of postural control and lower limb function for older adults living with HIV following stroke.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** Studies with participant >18 years

## References

Pollock A, Baer G, Langhorne P & Pomeroy V. Physiotherapy treatment approaches for the recovery of postural control and lower limb function following stroke: a systematic review. *Clinical Rehabilitation*. 2007; 21(5): 395-410.

## E.5 - Rehabilitation (Electromechanical and robotic gait training)

**Recommendation 33: Electromechanical-assisted gait training** in combination with physiotherapy may be recommended for older adults living with HIV with stroke (particularly those within 3 months post stroke) as this intervention is associated with a higher likelihood to achieve independent walking than gait training alone.

**Level of Evidence:** High (Cochrane systematic review)

**Age of Participants in Research Evidence:** Mean age 61 years

## Reference

Mehrholz J, Werner C, Kugler J & Pohl M. Electromechanical-assisted training for walking after stroke. *Cochrane Database of Systematic Reviews* 2007, Issue 4. Art. No.: CD006185. DOI: 10.1002/14651858.CD006185.pub2.

## E.6 – Exercise

**Recommendation 34: Combined aerobic and resistive exercise** should be a component of stroke rehabilitation for older adults living with HIV with stroke who are medically stable at any stage of motor recovery. Higher doses of exercise may be associated with better motor recovery. Specifically, **cardiorespiratory training** should be a component of exercise as evidence suggests speed, tolerance and independence during walking are improved. In addition, **strength training** may be a component of exercise as this can improve muscle strength in stroke patients and will not necessarily increase spasticity.

**Level of Evidence:** High (combination of systematic reviews and Cochrane reviews)

**Age of Participants in Research Evidence:** Majority of studies mean age >50 years

## References

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Ada L, Dorsch S & Canning CG. Strengthening interventions increase strength and improve activity after stroke: a systematic review. *Australian Journal of Physiotherapy*. 2006; 52(4): 241-248.

Pang MYC, Eng JJ, Dawson AS & Gylfadottir S. The use of aerobic exercise training in improving aerobic capacity in individuals with stroke: a meta-analysis. *Clinical Rehabilitation*. 2006; 20(2): 97-111.

Meek C, Pollock A, Potter J & Langhorne P. A systematic review of exercise trials post stroke. *Clinical Rehabilitation*. 2003; 17(1): 6-13.

## E.7 - Electrotherapeutic Modalities

**Recommendation 35: Electrotherapeutic modalities** in isolation are not recommended for older adults living with HIV with stroke over conventional rehabilitation interventions strategies. Very weak to no evidence exists to support the use of electrotherapeutic modalities (functional electrical stimulation, biofeedback, visual feedback therapy) over conventional physical therapy interventions alone for muscle strength recovery, upper limb recovery or balance post stroke.

**Explanatory Notes:** Impairment-focused interventions alone such as biofeedback, neuromuscular or transcutaneous nerve stimulation fail to generalize to functional improvements and are not recommended in isolation for older adults with HIV and stroke. Particular caution should be taken by rehabilitation professionals working with older adults with HIV who may not have complete intact sensation as they may be at risk for injury with intervention such electronic stimulation, electrotherapeutic modalities.

**Level of Evidence:** Moderate (systematic reviews and meta-analyses but not Cochrane)

**Age of Participants in Research Evidence:** Mean age >50 years and Studies with participant >18 years

### References

Van Peppen RPS, Kortzmit M, Lindeman E & Kwakkel G. Effects of visual feedback therapy on postural control in bilateral standing after stroke: a systematic review. *Journal of Rehabilitation Medicine*. 2006; 38(1): 3-9.

Kottink AI, Oostendorp LJ, Buurke JH, Nene AV, Hermens HJ & IJzerman MJ. The orthotic effect of functional electrical stimulation on the improvement of walking in stroke patients with a dropped foot: a systematic review. *Artificial Organs*. 2004; 28(6): 577-586.

Van Peppen RP, Kwakkel G, Wood-Dauphinee S, Hendriks HJ, Van der Wees PJ & Dekker J. The impact of physical therapy on functional outcomes after stroke: what's the evidence? *Clinical Rehabilitation*. 2004; 18 (8): 833-862.

Glanz M, Klawansky S, Stason W, Berkey C & Chalmers TC. Functional electrostimulation in poststroke rehabilitation: a meta-analysis of the randomized controlled trials. *Archives of Physical Medicine & Rehabilitation*. 1996; 77(6): 549-553.

Moreland J & Thomson MA. Efficacy of electromyographic biofeedback compared with conventional physical therapy for upper-extremity function in patients following stroke: a research overview and meta-analysis. *Physical Therapy*. 1994; 74(6): 534-54.



Category  
F

Cardiovascular Disease (CVD)

HIV disease has been associated with an increased risk of cardiovascular complications (30). Dyslipidemia (abnormal amounts of lipid in the blood), insulin resistance, and central obesity coupled with an aging HIV-positive population have led to an increased incidence of cardiovascular events for adults with HIV (31).

The prevalence of hypertension among adults living with HIV ranged from 41% to 54% between 2000 and 2007 with rates higher for women compared to men in the same population (3, 16).

The prevalence of heart disease among adults living with HIV is 15%, Rates of heart disease in women (23%) is more than 2 times the rate of men living with HIV (12%) (3, 16).

The prevalence of coronary heart disease among adults living with HIV ranges from 7–8% (32).

The prevalence of asymptomatic ischemic heart disease among adults ages 50-59 years living with HIV is 13%, and increases to 17% for adults 60 years or older (33).

The prevalence of asymptomatic peripheral arterial disease (PAD) is low, but identified only in adults living with HIV with high cardiovascular risk (31).

**Disability Experienced by Adults with Cardiovascular Disease (CVD)**

Cardiovascular risks include abnormally elevated levels of lipids and/or lipoproteins in the blood (hyperlipidaemia), fat redistribution syndrome, insulin resistance, diabetes mellitus, hypertension and increased hospitalization (16, 30, 33, 34).

Cardiovascular disease can also lead to events such as a myocardial infarction resulting in a range of impairments, activity limitations and participation restrictions for adults with HIV.

We present six recommendations for rehabilitation and exercise interventions for older adults with HIV and cardiovascular disease, myocardial infarction, heart disease, or heart failure.

**Fi) Cardiovascular Disease (CVD)**

**Fi.1 – Cardiac Rehabilitation**

**Recommendation 36: Cardiac rehabilitation** in the form of **home-based or centre-based care** may be recommended because these appear equally effective in improving the clinical & health related quality of life outcomes for older adults with HIV with low risk **cardiovascular disease**. The choice of home versus centre-based care should be reflective of the individual preference of the patient as this may impact the uptake of rehabilitation.



## Evidence-Informed Recommendations in Rehabilitation for Older Adults Living with HIV

**Level of Evidence:** High (Cochrane reviews) and Moderate (systematic reviews and meta-analyses but not Cochrane)

**Age of Participants in Research Evidence:** Majority of mean age >50 years and Mean age >55 years

### References

Davies EJ, Moxham T, Rees K, Singh S, Coats AJS, Ebrahim S, Lough F & Taylor RS. Exercise based rehabilitation for heart failure. *Cochrane Database of Systematic Reviews* 2010, Issue 4. Art. No.: CD003331. DOI: 10.1002/14651858.CD003331.pub3.

Taylor RS, Dalal H, Jolly K, Moxham T & Zawada A. Home-based versus centre-based cardiac rehabilitation. *Cochrane Database of Systematic Reviews* 2010, Issue 1. Art. No.: CD007130. DOI: 10.1002/14651858.CD007130.pub2.

Clark AM, Hartling L, Vandermeer B & McAlister FA. Meta-analysis: Secondary prevention programs for patients with coronary artery. *Annals of Internal Medicine*. 2005; 143(9): 659-672. DOI: 10.7326/0003-4819-143-9-200511010-00010.

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Mullen PD, Mains DA & Velez R. A meta-analysis of controlled trials of cardiac patient education. *Patient Education & Counseling*. 1992; 19(2): 143-162. DOI: 10.1016/0738-3991(92)90194-N.

**Recommendation 37: Cardiac rehabilitation** for older adults with HIV should include reinforcement, feedback, offer opportunity for individualization, facilitate behaviour change through skills and resources and be relevant to patients' needs and abilities. Specifically, **motivational communication** such as formal cardiac rehabilitation program referral, reminder letters, phone calls and home visits may be recommended for increasing uptake and adherence of cardiac rehabilitation among older adults living with HIV and cardiovascular disease.

**Level of Evidence:** High (Cochrane reviews) and Moderate (systematic reviews and meta-analyses but not Cochrane)

**Age of Participants in Research Evidence:** Majority of mean age >50 years and Mean age >55 years

## References

Davies EJ, Moxham T, Rees K, Singh S, Coats AJS, Ebrahim S, Lough F & Taylor RS. Exercise based rehabilitation for heart failure. *Cochrane Database of Systematic Reviews* 2010, Issue 4. Art. No.: CD003331. DOI: 10.1002/14651858.CD003331.pub3.

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## Fii) CVD - Myocardial Infarction

### Fii.1 – Cardiac Rehabilitation

**Recommendation 38a: Exercise-based cardiac rehabilitation** should be recommended for older adults with HIV who have undergone a myocardial infarction (MI) (otherwise known as a heart attack) (or at risk of an MI) given evidence suggests exercise based cardiac rehabilitation is effective in reducing cardiac deaths. The ideal frequency, intensity, time and type of exercise to maximize benefits are unclear.

**Recommendation 38b: Early mobilization and rehabilitation** and specifically, **secondary and tertiary prevention programs** (including counseling, education, and exercise) should be recommended to older adults living with HIV who experience an MI as these have the potential to reduce subsequent MI and mortality and improve processes of care, risk factor profiles and functional status and quality of life.

**Level of Evidence:** High (Cochrane reviews) and Moderate (systematic reviews and meta-analyses but not Cochrane)

**Age of Participants in Research Evidence:** Majority of mean age >50 years and Mean age >55 years

## References

Davies EJ, Moxham T, Rees K, Singh S, Coats AJS, Ebrahim S, Lough F & Taylor RS. Exercise based rehabilitation for heart failure. *Cochrane Database of Systematic Reviews* 2010, Issue 4. Art. No.: CD003331. DOI: 10.1002/14651858.CD003331.pub3.

Taylor RS, Dalal H, Jolly K, Moxham T & Zawada A. Home-based versus centre-based cardiac rehabilitation. *Cochrane Database of Systematic Reviews* 2010, Issue 1. Art. No.: CD007130. DOI: 10.1002/14651858.CD007130.pub2.

Clark AM, Hartling L, Vandermeer B & McAlister FA. Meta-analysis: Secondary prevention programs for patients with coronary artery. *Annals of Internal Medicine*. 2005; 143(9): 659-672. DOI: 10.7326/0003-4819-143-9-200511010-00010.

Herkner H, Thoennissen J, Nikfardjam M, Koreny M, Laggner AN & Mullner M. Short versus prolonged bed rest after uncomplicated acute myocardial infarction: a systematic review and meta-analysis. *Journal of Clinical Epidemiology*. 2003; 56(8): 775-781.

Jolliffe J, Rees K, Taylor RRS, Thompson DR, Oldridge N & Ebrahim S. Exercise-based rehabilitation for coronary heart disease. *Cochrane Database of Systematic Reviews* 2001, Issue 1. Art. No.: CD001800. DOI: 10.1002/14651858.CD001800.

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## Fiii) CVD - Coronary Artery Disease and Coronary Heart Disease

### Fiii.1 – Exercise

**Recommendation 39: Moderate intensity exercise (and potentially progressive resistive exercise) should be recommended** for older adults with HIV with **cardiovascular disease** who are medically stable to reduce high blood pressure and potentially mitigate the effect of coronary heart disease. Exercise may be associated with improved cardiovascular health and well-being as a result of enhanced self-efficacy. More research is required to determine the ideal frequency and duration of exercise that should be recommended to see psychological improvement. **High intensity aerobic exercise** may increase High Density Lipoprotein Cholesterol (HDL-C) levels, while **combined aerobic and resistance exercise** may lower Low Density Lipoprotein Cholesterol (LDL-C) levels and should be recommended for older adults with HIV to improve their cardiovascular health.

**Level of Evidence:** Moderate (systematic reviews but not Cochrane)

**Age of Participants in Research Evidence:** Two of the studies had mean age >50 years whereas other two studies participant ranged 18-80 years

## References

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Netz Y, Wu M-J, Becker BJ, & Tenebaum G. Physical activity and psychological well-being in advanced age: A meta-analysis of intervention studies. *Psychology and Aging*. 2005; 20(2): 272–284. DOI: 10.1037/0882-7974.20.2.272.

Halbert JA, Silagy CA, Finucane P, Withers RT, Hamdorf PA & Andrews GR. The effectiveness of exercise training in lowering blood pressure: a meta-analysis of randomised controlled trials of 4 weeks or longer. *Journal of Human Hypertension*. 1997; 11(10): 641-649.

## Fiv) CVD – Heart Failure

### Fiv.1 – Exercise

**Recommendation 40: Home-based moderate intensity exercise (and potentially progressive resistive exercise) as well as supervised and hospital-based exercise programs** appear to be safe and should be recommended for older adults with HIV and heart failure who are medically stable for potential improvements in cardiac function, exercise capacity (including peak oxygen consumption), physical function, mortality and quality of life and potentially a reduction in hospital admissions. Optimal session frequency, session duration, exercise intensity, program duration is unclear.

**Level of Evidence:** High (combination of Cochrane systematic review and other systematic reviews) and Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** Majority of studies mean age >50 years and Age range 19-83 years (only 6/31 studies had participant >80 years)

## References

Davies P, Taylor F, Beswick A, Wise F, Moxham T, Rees K & Ebrahim S. Promoting patient uptake and adherence in cardiac rehabilitation. *Cochrane Database of Systematic Reviews* 2010, Issue 7. Art.No.: CD007131. DOI: 10.1002/14651858.CD007131.pub2.

Chien C-L, Lee CM Wu Y-W, Chen T-A & Wu Y-T. Home-based exercise increases exercise capacity but not quality of life in people with chronic heart failure: a systematic review. *Australian Journal of Physiotherapy*. 2008; 54(2): 87-93.

Haykowsky M, Clark AM, Liang Y, Pechter D, Jones LW & McAlister FA. A meta-analysis of the effect of exercise training on left ventricular remodeling in heart failure patients: The benefit depends on the type of training performed. ACC Cardiosource Review Journal. 2007; 16(10): 33-37.

Smart N & Marwick TH. Exercise training for patients with heart failure: a systematic review of factors that improve mortality and morbidity. American Journal of Medicine. 2004; 116(10): 693-706.

Lloyd-Williams F, Mair FS & Leitner M. Exercise training and heart failure: a systematic review of current evidence. British Journal of General Practice. 2002; 52(474): 47-55.

Halbert JA, Silagy CA, Finucane P, Withers RT & Hamdorf PA. Exercise training and blood lipids in hyperlipidemic and normolipidemic adults: a meta-analysis of randomized, controlled trials. European Journal of Clinical Nutrition. 1999; 53(7): 514-522.

**Recommendation 41: Aerobic exercise (and possibly resistive exercise)** at least 3 times per week may be recommended to older adults living with HIV and **hyperlipidemia** for the potential to improve blood lipids. Clinical importance of the changes is unclear.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** Age range 19-83 years (only 6/31 studies had participant >80 years)

### Reference

Halbert JA, Silagy CA, Finucane P, Withers RT & Hamdorf PA. Exercise training and blood lipids in hyperlipidemic and normolipidemic adults: a meta-analysis of randomized, controlled trials. European Journal of Clinical Nutrition. 1999; 53(7): 514-522.

## Category G

### Mental Health Challenges

Although older adults living with HIV report more depressive symptoms and higher levels of life-stressor burden than their younger counterparts, older adults reported advanced age provided them with more adaptive coping and problem-solving skills. They also reported feeling less threatened by illness and disability compared to younger persons with HIV (16, 35, 36).

Depression in adults living with HIV is associated with neuropsychological impairment. Approximately 25% of older adults living with HIV are diagnosed with depression (36-38). The prevalence of psychological disorders (such as depression) among adults with HIV is 17%, and are more prevalent among older women living with HIV (23%) compared to older men living with HIV (14%) (3).

#### Disability Experienced by Adults with Mental Health Challenges

Challenges experienced by adults living with HIV and mental health issues include HIV-associated stigma, increased loneliness, decreased cognitive functioning, reduced level of energy, employment worries and reduced access to health care and social services due to AIDS-related stigma (36, 39, 40).

We present four recommendations for models of care, exercise, psychotherapy, and housing interventions for older adults living with HIV and varying forms of mental health issues.

#### Gi) Mental Health Challenges (Older adults with mental health issues)

##### Gi.1 – Models of Care

**Recommendation 42:** Inconclusive or insufficient evidence exists to support a recommendation for a specific model of mental health care (**acute psychogeriatric care over acute psychiatric units versus other mental health services**) for older adults with HIV living with **mental health issues**. More research is needed before recommending one model of care over another.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** All participant >60 years

#### Reference

Draper B & Low L-F. What is the effectiveness of acute hospital treatment of older people with mental disorders? *International Psychogeriatrics*. 2005; 17(4): 539-555.

## Gii) Mental Health Challenges (anxiety)

### Gii.1 – Exercise

**Recommendation 43:** Exercise appears safe and should be recommended (approximately 30 minutes per session) to older adults with HIV living with other chronic conditions illnesses such as cardiovascular disease (CVD), cancer, chronic pain, fibromyalgia as a way to reduce symptoms of **anxiety**.

**Level of Evidence:** Moderate (systematic review and meta-analysis but not Cochrane)

**Age of Participants in Research Evidence:** Mean age 50 years

#### Reference

Herring MP, O'Connor PJ & Dishman RK. The effect of exercise training on anxiety symptoms among patients: a systematic review. *Archives of Internal Medicine*. 2010; 170(4): 321-331.

## Giii) Mental Health Challenges (Depression)

### Giii.1 – Psychotherapy

**Recommendation 44:** Inconclusive or insufficient evidence exists to support the use of **cognitive behavioural therapy** with older adults with HIV and **depression**.

**Explanatory Notes:** Despite inconclusive evidence, clinicians and PLHIV reported using this intervention in their practice with adults with HIV who are depressed.

**Level of Evidence:** High (Cochrane review)

**Age of Participants in Research Evidence:** All participants >55 years

#### Reference

Wilson K, Mottram PG & Vassilas C. Psychotherapeutic treatments for older depressed people. *Cochrane Database of Systematic Reviews* 2008, Issue 1. Art. No.: CD004853. DOI: 10.1002/14651858.CD004853.pub2.

## Giv) Mental Health Challenges (severe mental illness)

### Giv.1 – Housing Models

**Recommendation 45:** Supporting older adults living with HIV in securing **safe and stable housing** should be an important component of the rehabilitation process for older adults with HIV with **severe mental illness** given the positive impact of stable housing for this target population.



## Evidence-Informed Recommendations in Rehabilitation for Older Adults Living with HIV

**Level of Evidence:** Moderate (meta-analysis but not Cochrane)

**Age of Participants in Research Evidence:** Younger adults (mean age 39 years)

### Reference

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## Category H

### Cognitive Impairments

As many as 50% of adults living with HIV report cognitive difficulties, which can be associated with neuropsychological impairment (41, 42).

HIV-associated neurocognitive disorders (HAND) has been divided into three subclasses: asymptomatic neurocognitive impairments, mild neurocognitive disorder and HIV-associated dementia (HAD) (43). The prevalence of HIV-associated dementia (HAD) ranges from 8-15% for older men and women living with HIV (44, 45). Approximately 15% of adults living with HIV have Minor Cognitive Motor Disorder (MCMD) (46).

The process of neurological decline similar to Alzheimer's disease and Parkinson's disease (Parkinsonism related to HIV) has been reported in adults living with HIV (4, 47). The prevalence of Parkinsonism related to HIV is very low, ranging from 1% to 5% (47).

#### Disability Experienced with Cognitive Impairments

The challenges faced by adults living with HIV and cognitive disorders may include lower attention, motor speed, constructional abilities (impairment forming designs, objects, or materials with hands, under visual guidance), and verbal memory (41, 48-51).

The challenges specific to HAD include psychomotor slowing, apathy and motor disorders, similar to the bradykinesia and postural and gait abnormalities observed in late Parkinson's disease (52).

We present three recommendations for cognitive rehabilitation and exercise interventions for older adults living with HIV with varying levels of neurocognitive impairments.

#### Hi) Cognitive Impairment – Mild to Moderate Cognitive Impairment

##### Hi.1 – Cognitive Rehabilitation

**Recommendation 46: Cognitive interventions** including cognitive training, cognitive stimulation, and cognitive rehabilitation should be recommended for older adults living with HIV with **mild cognitive impairment** because they are associated with significant improvements objective and subjective measures of memory, quality of life and mood / anxiety with benefits translated to improvements in daily functioning and mood. Specifically, **errorless learning** may be recommended for a potential positive effect on recall for older adults with HIV and cognitive impairment.

**Level of Evidence:** Moderate (systematic review but not Cochrane)

**Age of Participants in Research Evidence:** Younger and older adults with cognitive impairment

## References

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## Hii) Cognitive Impairment

### Hii.1 – Exercise

**Recommendation 47:** A **combination of aerobic and resistive (strengthening) exercise** should be recommended for older adults living with HIV with cognitive impairment for improvements in fitness, physical function, cognitive function, and positive behaviour. Evidence suggests older adults with **cognitive impairment** may benefit from exercise as much as older adults with no cognitive impairment. Due to diversity in exercise programs, measures of cognition, and study populations in the evidence, the optional type of exercise program (content, intensity, frequency, and duration) is unclear.

**Recommendation 47a:** Specifically, **aerobic exercise** may be associated with improvements in neurocognitive function among older adults with HIV with cognitive impairment for attention and processing speed, executive function, and memory.

**Level of Evidence:** Moderate (systematic review and meta-analysis but not Cochrane)

**Age of Participants in Research Evidence:** Majority of studies included older adults >60 years

## References

Smith PJ, Blumenthal JA, Hoffman BM, Cooper H, Strauman TA, Welsh-Bohmer K, Browndyke JN & Sherwood A. Aerobic Exercise and Neurocognitive Performance: A Meta-Analytic Review of Randomized Controlled Trials. *Psychosomatic Medicine*. 2010; 72(3): 239–252. DOI: 10.1097/PSY.0b013e3181d14633.

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### Hiii) Cognitive Impairment – Dementia

#### Hiii.1 – Exercise

**Recommendation 48: Physical exercise** appears to be safe and may be recommended for older adults living with HIV and dementia however insufficient evidence exists to suggest benefits to cognition, function, behaviour, depression, and mortality.

**Level of Evidence:** High (majority Cochrane systematic reviews)

**Age of Participants in Research Evidence:** Older adults >65 years

#### References

Forbes D, Forbes S, Morgan DG, Markle-Reid M, Wood J & Culum I. Physical activity programs for persons with dementia. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD006489. DOI: 10.1002/14651858.CD006489.pub2.

Robinson L, Hutchings D, Dickinson HO, Corner L, Beyer F, Finch T, Hughes J, Vanoli A, Ballard C & Bond J. Effectiveness and acceptability of non-pharmacological interventions to reduce wandering in dementia: a systematic review. *International Journal of Geriatric Psychiatry*. 2007; 22(1): 9-22.

## Category

## I

**Chronic Obstructive Pulmonary Disease (COPD)**

Chronic Obstructive Pulmonary Disease (COPD) occurs in more than 5% of the general population of adults over 45 years of age (53). COPD includes chronic bronchitis, emphysema and asthma. The prevalence of COPD among older adults living with HIV ranges from 10 - 16%, and is more prevalent among women (21%) compared with men (14%) living with HIV (3, 54).

With an increased prevalence of smoking among people living with HIV compared to the general population, adults with HIV are at increased risk of developing COPD (3, 18).

**Disability Experienced by Adults with COPD**

Challenges faced by adults living with HIV and COPD may include small airways abnormalities and nonspecific airway hyper-responsiveness. Challenges may also include shortness of breath, decreased activity tolerance, and a productive cough (3, 54).

We present three recommendations for pulmonary rehabilitation, exercise, and inspiratory muscle training (IMT) interventions for older adults living with HIV and COPD.

**I.1 – Pulmonary Rehabilitation**

**Recommendation 49: Pulmonary rehabilitation** (including upper and lower extremity exercise, inspiratory muscle training and breathing exercises) for at least four weeks is safe and strongly recommended for older adults living with HIV who have chronic obstructive pulmonary disease (COPD) to reduce mortality, improve dyspnea, health-related quality of life, functional exercise capacity and reduce future hospital admissions. Individuals with more severe COPD may require longer rehabilitation programs of at least 6 months to demonstrate benefits.

**Level of Evidence:** High (combination of Cochrane systematic reviews and meta-analysis but not Cochrane)

**Age of Participants in Research Evidence:** Majority of participants >60 years

**References**

Puhan MA, Gimeno-Santos E, Scharplatz M, Troosters T, Walters EH & Steurer J. Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews 2009, Issue 1. Art. No.: CD005305. DOI: 10.1002/14651858.CD005305.pub2.

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## I.2 – Exercise

**Recommendation 50: Aerobic and progressive resistance exercise** at least two times per week for at least 8 weeks appears feasible, safe and may be recommended for older adults with HIV with **mild to moderate chronic obstructive pulmonary disease (COPD)** for improvements in exercise capacity and muscle strength that may translate into improved activity performance and societal participation. Careful consideration is required when prescribing progressive resistance exercise programs for people with COPD who have comorbid health conditions.

**Level of Evidence:** Moderate (systematic reviews and meta-analyses but not Cochrane)

**Age of Participants in Research Evidence:** Mean age >58 years

### References

O'Shea SD, Taylor NF & Paratz JD. Progressive resistance exercise improves muscle strength and may improve elements of performance of daily activities for people with COPD: A systematic review. *Chest*. 2009; 136(5): 1269-1283. Prepublished online September 4, 2009. DOI: 10.1378/chest.09-0029. Available from <http://chestjournal.chestpubs.org/content/136/5/1269.full.html>.

Chavannes N, Vollenberg JJH, van Schayck CP & Wouters EFM. Effects of physical activity in mild to moderate COPD: a systematic review. *British Journal of General Practice*. 2002; 52(480): 574-578.

## I.3 – Inspiratory Muscle Training (IMT)

**Recommendation 51: Inspiratory muscle training (IMT)** is an important component of pulmonary rehabilitation and is strongly recommended for older adults living with HIV with chronic obstructive pulmonary disease (COPD) to improve inspiratory muscle strength and endurance, dyspnea, exercise capacity and quality of life. Optimal frequency, intensity, supervision and duration of IMT is unclear.

**Level of Evidence:** High (used Cochrane methodology)

**Age of Participants in Research Evidence:** Mean age 63 years

### References

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## Category

## J

## Diabetes

The prevalence of diabetes mellitus (DM) among adults living with HIV ranges from 3-15% (3, 55, 56). Diabetes mellitus is 2 times more prevalent among men compared to women living with HIV (3). With the presence of Hepatitis C, the prevalence of diabetes mellitus can increase up to 6% from 3% (55, 56).

Risk factors for developing diabetes include advancing age, being male, long period of HIV infection, and specific ethnicity (African Descent, Hispanic/Latino and Aboriginal) (5).

Adults living with HIV on combination antiretroviral therapy are at increased risk of developing diabetes, thus individuals should be screened for diabetes at onset of therapy initiation and about two to six months after (5).

### Disability Experienced by Adults with Diabetes

Challenges faced among adults living with HIV and diabetes are lower body mass index preceded by impaired insulin tolerance and resistance, and high rates of Hepatitis C-virus infections (56, 57).

We present one recommendation for exercise for older adults living with HIV and diabetes.

### J.1 – Exercise

**Recommendation 52: Aerobic resistive exercise** for at least 8 weeks is strongly recommended for older adults living with HIV with diabetes (type 2) to improve cardiopulmonary fitness and ensure glucose control. Optimal frequency, intensity, time and type of exercise are unclear however evidence suggests increased exercise prescription, fitness testing, supervision and group sessions at a greater number of times per week may be associated with greater health benefits. See the specific guidelines for more details.

**Explanatory Notes:** Exercise may also be considered as a preventative approach to prevent type 2 diabetes among older adults with HIV. Exercise may be particularly important in building up strength among PLHIV who may have had muscle wasting and poor nutrition related to diabetes

**Level of Evidence:** High (combination of Cochrane systematic reviews and meta-analyses not Cochrane)

**Age of Participants in Research Evidence:** Three of four studies - participant mean age 55 years (type 2 diabetes)

### References

Nielsen PJ, Hafdahl AR, Conn VS, LeMaster JW & Brown SA. Meta-analysis of the effect of exercise interventions on fitness outcomes among adults with type 1 and type 2 diabetes. *Diabetes Research & Clinical Practice*. 2006; 74(2): 111-120.

Snowling NJ & Hopkins WG. Effects of Different Modes of Exercise Training on Glucose Control and Risk Factors for Complications in Type 2 Diabetic Patients. *Diabetes Care*. 2006; 29(11): 2518-27. Available from: <http://care.diabetesjournals.org/content/29/11/2518.full?sid=1c88f8f9-d4c9-4a13-9063-8613e7129ab5>.

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Thomas D, Elliott EJ & Naughton GA. Exercise for type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD002968. DOI: 10.1002/14651858.CD002968.pub2.

Boulé NG, Kenny GP, Haddad E, Wells GA & Sigal RJ. Meta-analysis of the effect of structured exercise training on cardiorespiratory fitness in Type 2 diabetes mellitus. *Diabetologia*. 2003; 46(8):1071–1081.



Figure 1: Overall Classification of Evidence-Informed Recommendations

**Stream A Recommendations**  
**HIV Aging and Rehabilitation**  
 Derived from 42 low or very low level evidence articles

Recommendation Theme	#
Preparedness of Rehabilitation Professionals	1
Approaches to Rehabilitation Assessment and Treatment (physical, mental, neurocognitive, uncertainty, social inclusion)	7
Extrinsic Factors to consider with rehabilitation of older adults with HIV (ageism, stigma, disclosure, social support)	3
Intrinsic Factors to consider with rehabilitation of older adults with HIV (self-management, spirituality)	2
Rehabilitation Approaches (interprofessional practice, CAM)	2
Rehabilitation Interventions (exercise)	1
<b>Total # Recommendations</b>	<b>16</b>

**Stream B Recommendations**  
**Rehabilitation Interventions in Comorbidities**  
 Derived from 108 high level evidence articles (meta-analyses or systematic reviews)

Recommendation Classification	#
<b>Bone and Joint Disorders</b> Exercise, rehabilitation, self-management	4
<b>Cancer</b> Exercise	4
<b>Stroke</b> Rehabilitation, cognitive rehabilitation, electrotherapeutic modalities	7
<b>Cardiovascular Disease</b> Cardiac rehabilitation, exercise	6
<b>Mental Health</b> Exercise, psychotherapy, models of care and housing models	4
<b>Cognitive Impairment</b> Exercise, cognitive rehabilitation	3
<b>COPD</b> Pulmonary rehabilitation, inspiratory muscle training, exercise	3
<b>Diabetes</b> Exercise	1
<b>Older Adults</b> Exercise	3
<b>HIV</b> Exercise	1
<b>Total # Recommendations</b>	<b>36</b>

52 Detailed (Specific) Evidence-Informed Recommendations

Endorsement Rates for Each Recommendation Ranged from 53% - 100%

Overarching Recommendations on Rehabilitation for Older Adults with HIV (n=8)

1) Rehabilitation Professionals (RPs) should be **prepared to provide care** to older adults with HIV who present with complex comorbidities...

2) RPs should adopt an **individualized approach to practice, sensitive to unique values, preferences and needs** of older adults with HIV....

3) **Multidisciplinary rehabilitation** is strongly recommended across continuum of care...

4) RPs should consider the role of **extrinsic contextual factors** (stigma, ageism, HIV disclosure, social supports)....

5) RPs should consider the role of **intrinsic contextual factors** (self-management, spirituality) ....

6) **Aerobic and resistive exercise** may be recommended for older adults with HIV who are medically stable and living with comorbidities....

7) **Cognitive rehabilitation** interventions may be recommended for older adults with HIV with mild cognitive impairments and stroke...

8) In absence of high level evidence RPs should **refer to high level evidence for recommendations on interventions for a specific comorbidity**....

## Evidence-Informed Recommendations in Rehabilitation for Older Adults Living with HIV

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\*Indicates four references (interventions) that were referred to in the document but were not in the final recommendations.