

Exercise Is Medicine

1. HIV: **More** than anti-retroviral therapy
2. Health aging
 - Aging is more than biology
 - WHO Model of healthy aging
3. Non_aids defining comorbidities
4. Exercise – physical activities
 - sustains the hallmarks of age
 - Training and its effects of exercise training
5. My summary and my view

Conflicts of interest

- Educational grants and support
 - Consultancy
- by Gilead, ViiV, MSD

1. HIV: More than anti-retroviral therapy

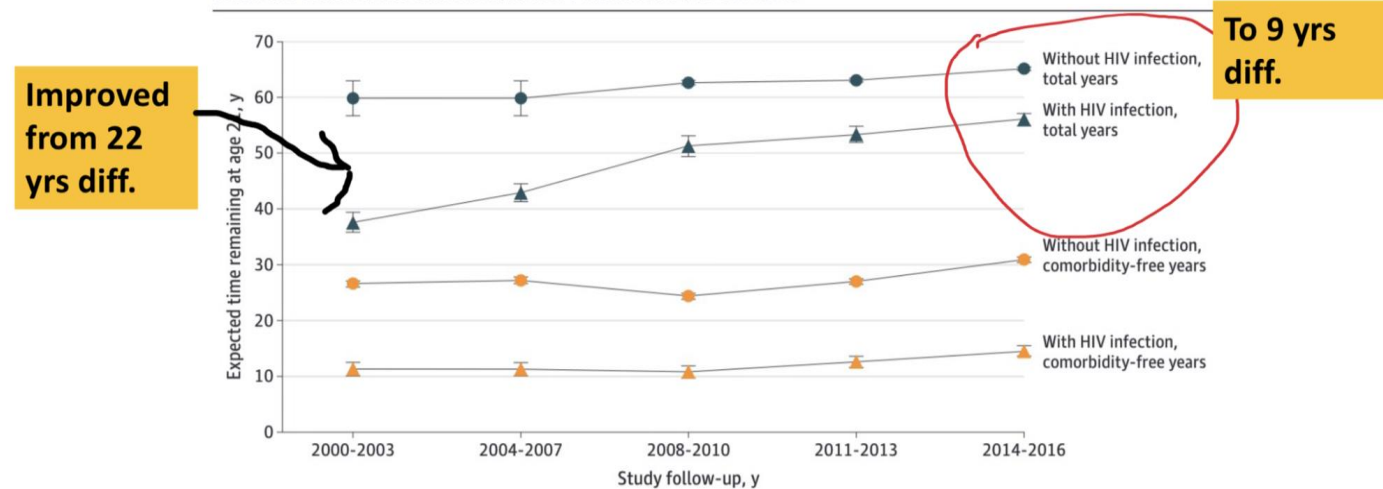
People living with HIV are getting much older:

- High prevalence of cardiovascular risk factors and comorbidities
- Low physical fitness
- Sarcopenia „epidemic“
- Accelerated aging and frailty with HIV (chronic inflammation, immune senescence)

9 Years Less Life Expectancy – 77 for PLWH vs 86

mean age 41 (10.8), 87% male; 25.1% were non-Hispanic black and 87 191 (24.3%) were Hispanic; HIV+ more poor; drug use disorders, ever smoked, lower rate of obesity or overweight, 70% MSM

Figure 1. Overall and Comorbidity-Free Life Expectancy at Age 21 Years for Individuals With and Without HIV Infection, Kaiser Permanente, 2000-2016

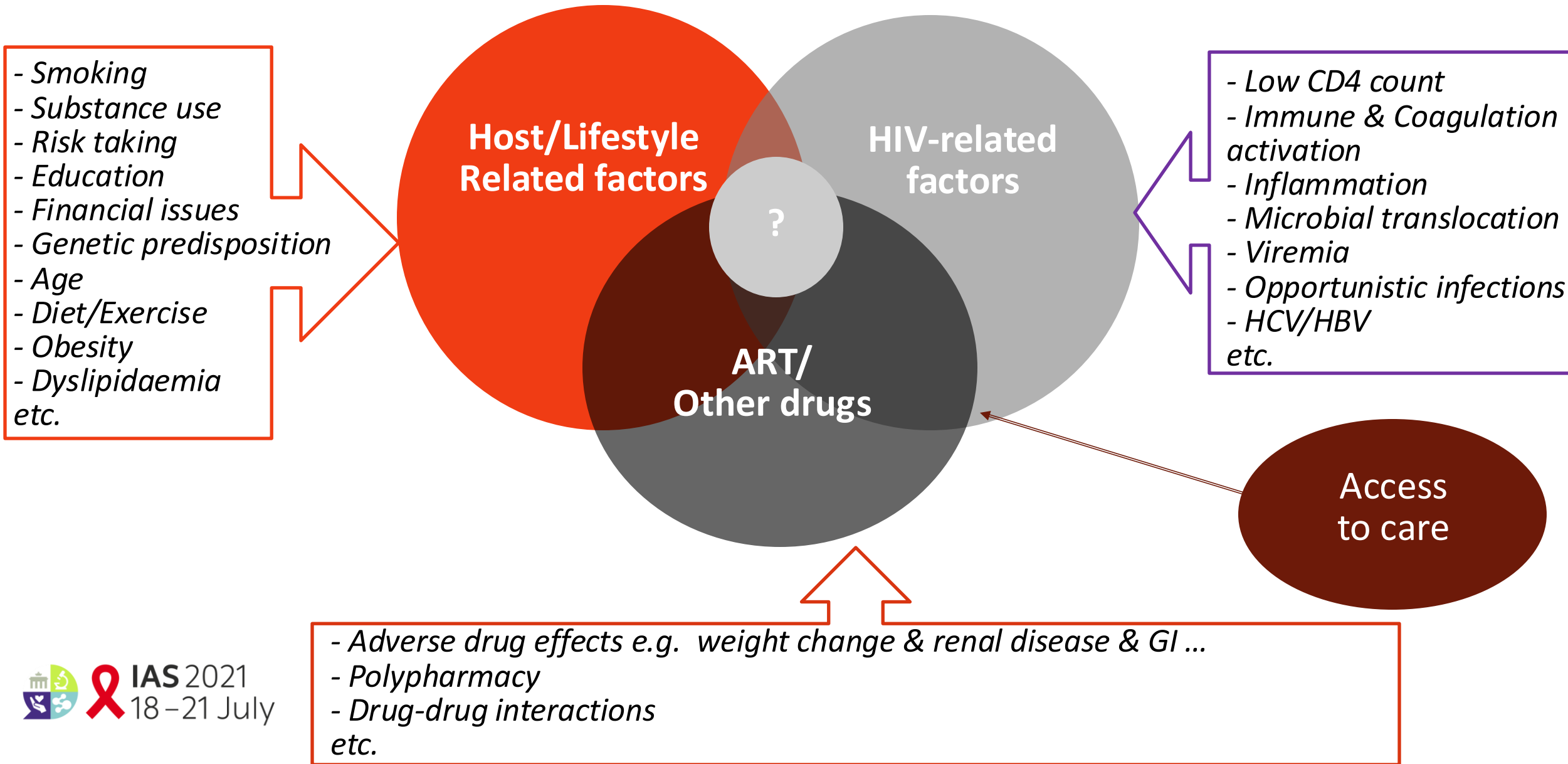


Julia Marcus et al. JAMA Network Open 2020

1. HIV: More than anti-retroviral therapy

Mechanisms?

Factors Associated with Co-morbidities in PLWH



2. Healthy aging

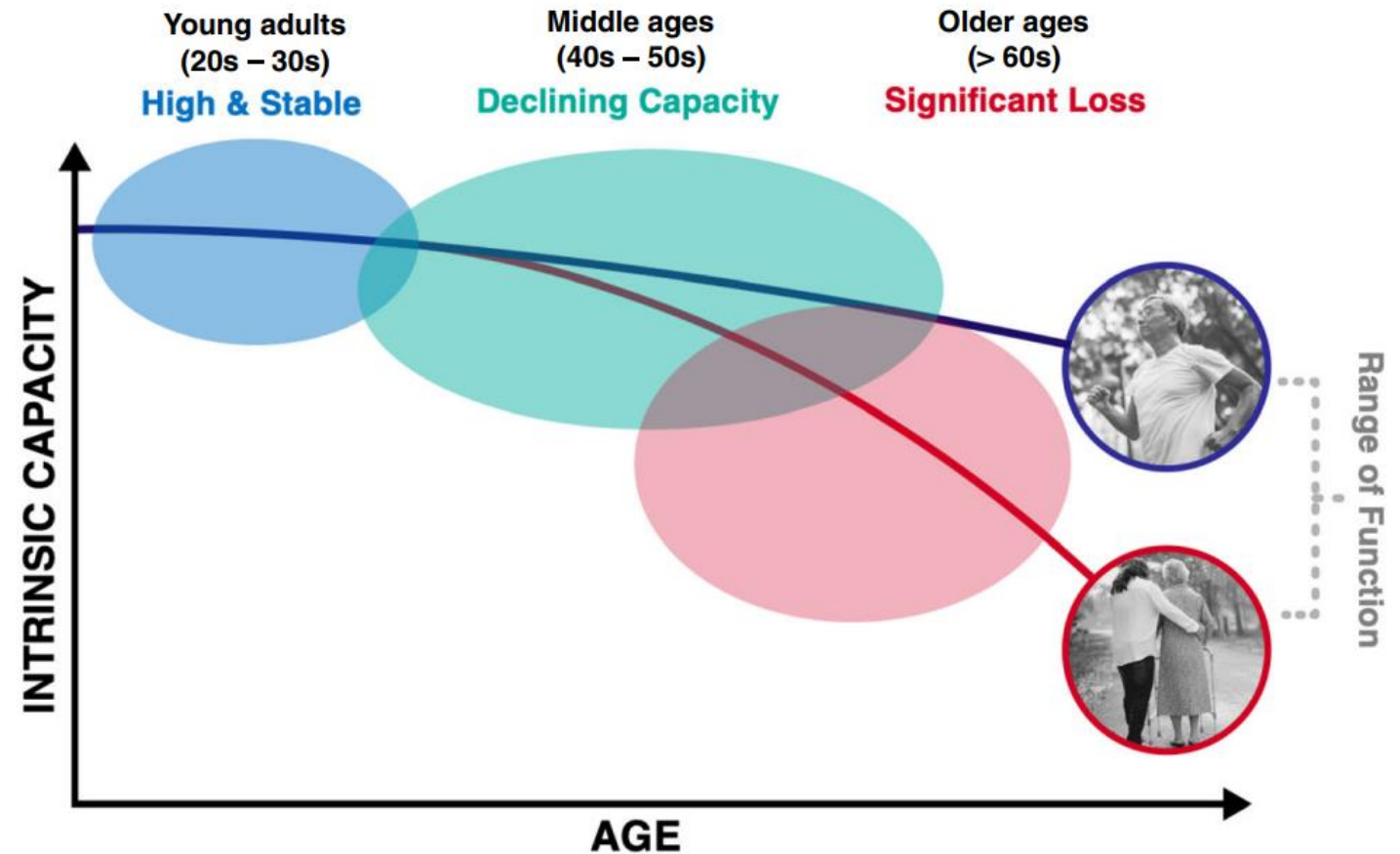
WHO Model of healthy aging

A process of developing and maintaining functional abilities that enables well-being in older age

Intrinsic capacities

(Composite of all physical and mental capacities)

- Cognition
- Locomotion
- Psychological
- Vitality
- Sensory



3. Non_AIDS defining comorbidities

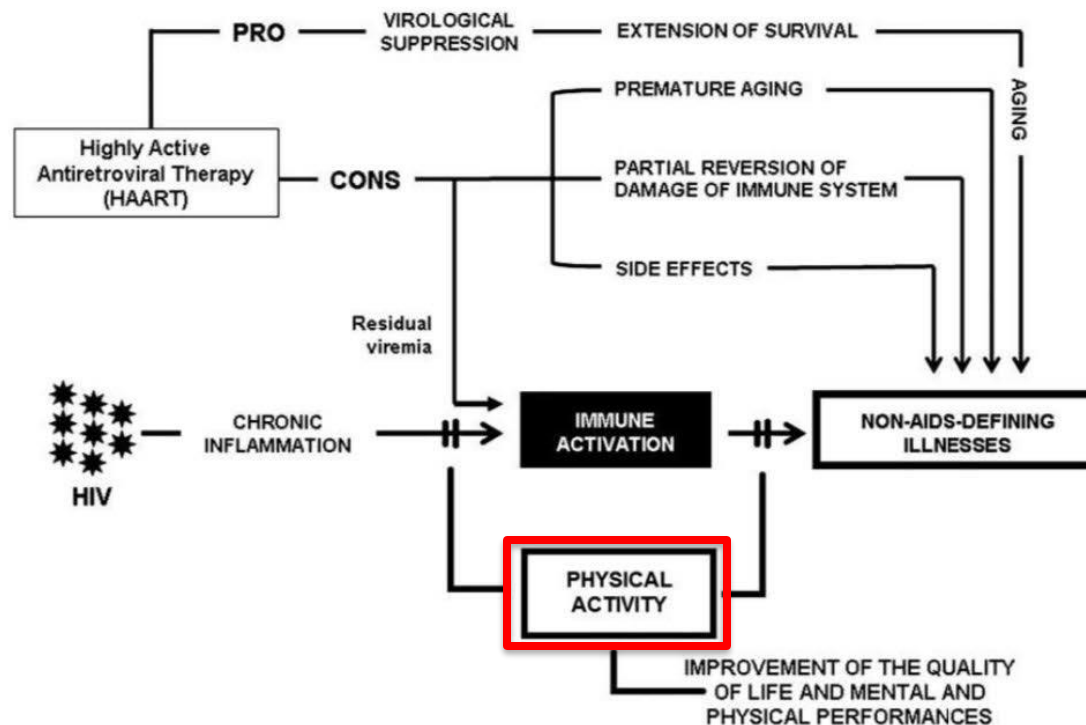
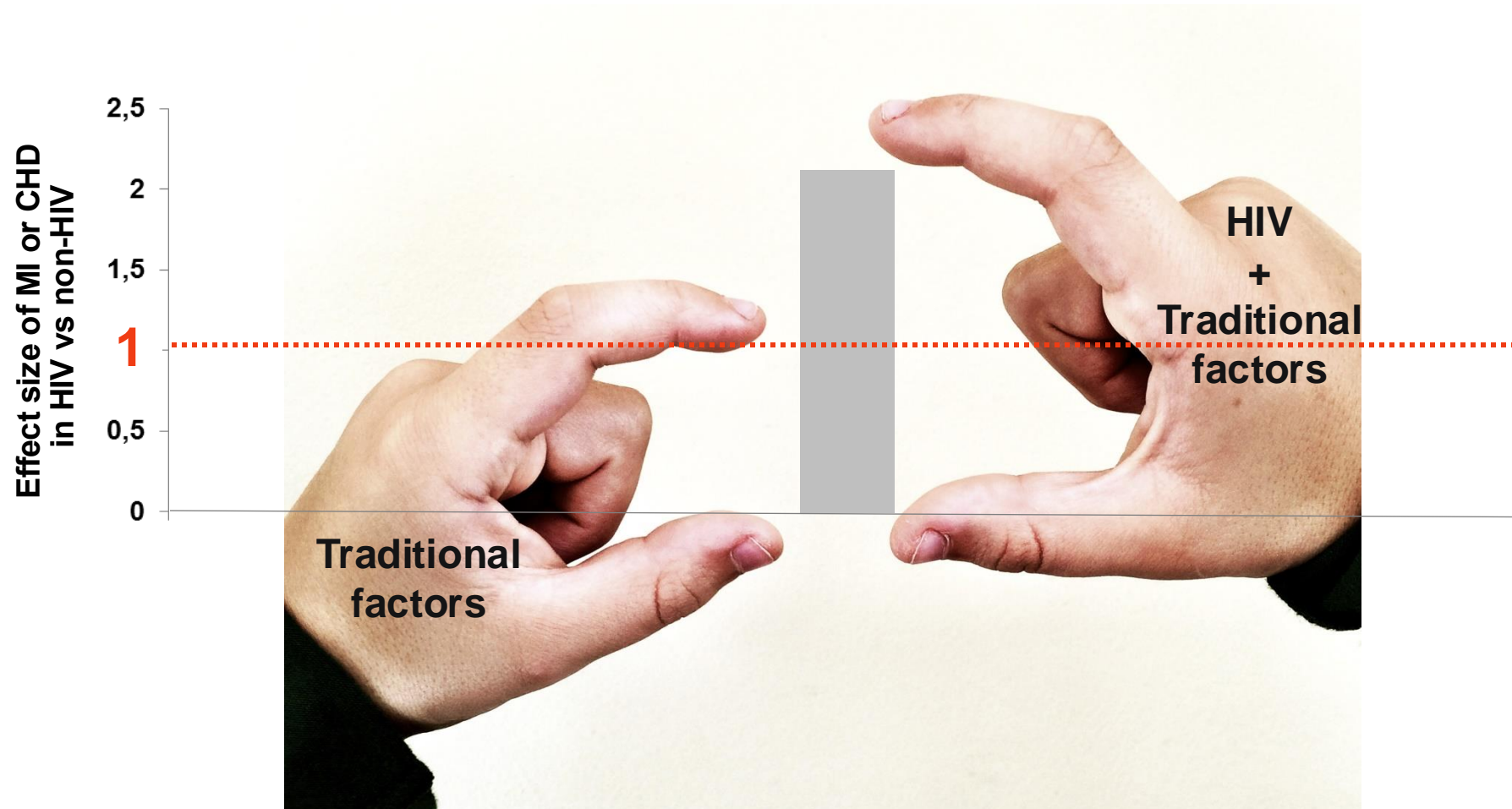


FIG. 1. Potential benefits of physical activity on chronic HIV infection. HIV-positive patients present a low level of chronic immune activation and inflammation associated with an increased incidence of non-AIDS-defining illnesses and accelerated aging. Even antiretroviral therapy can contribute to accelerated aging and to the occurrence of adverse effects, despite the undeniable benefits that it is able to give. The introduction of regular physical exercise in HIV treatment may have a significant therapeutic effect: it could reduce the impact of immune activation and non-AIDS-defining illness linked to chronic inflammation. Moreover, physical activity could generate improvements in neuropsychological function and metabolic assessment.

3. Non_AIDS defining comorbidities

The cardiovascular risk in people living with HIV is higher than explainable by traditional risk factors



3. Non_AIDS defining comorbidities



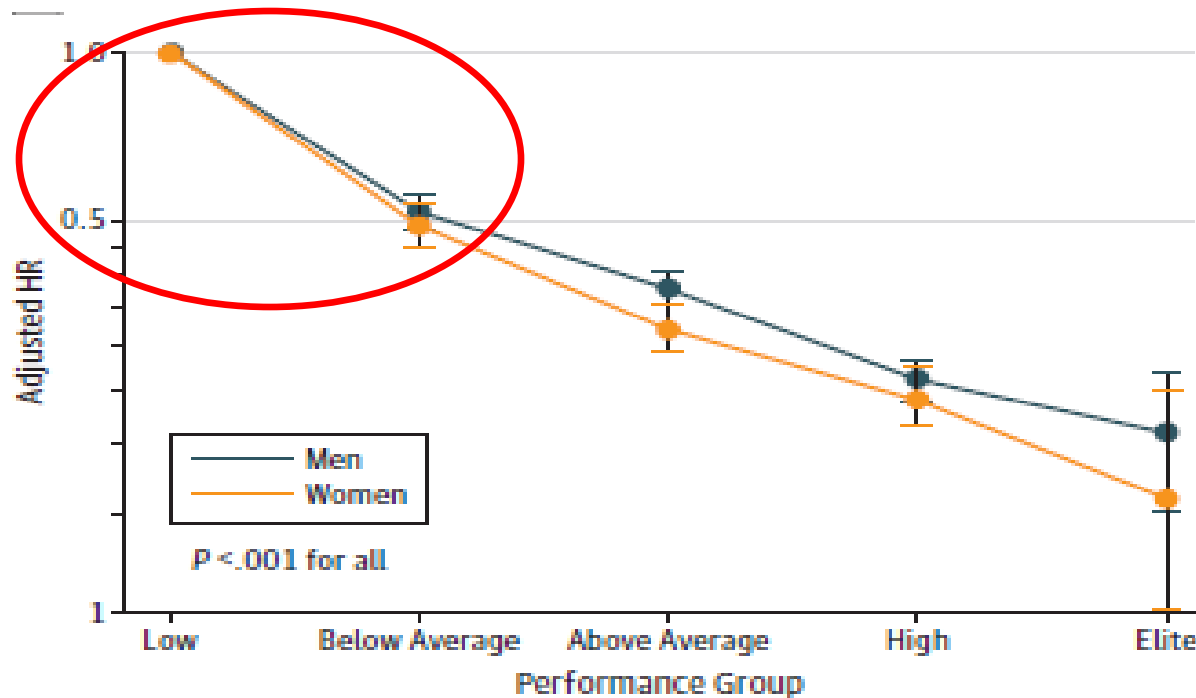
Original Investigation | Cardiology

Association of Cardiorespiratory Fitness With Long-term Mortality Among Adults Undergoing Exercise Treadmill Testing

Kyle Mandsager, MD; Serge Harb, MD; Paul Cremer, MD; Dermot Phelan, MD, PhD; Steven E. Nissen, MD; Wael Jaber, MD

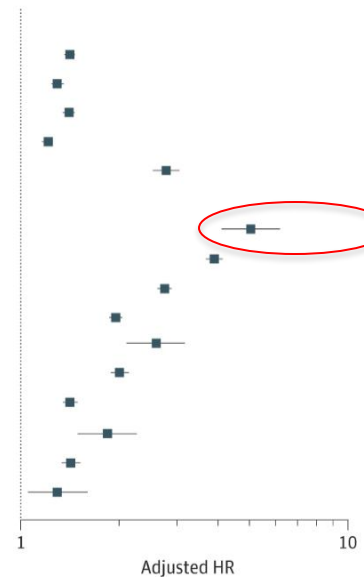
n=122.007
Follow up: 8.4 J.

Mortality: hazard ratio



C Comorbidities and performance groups

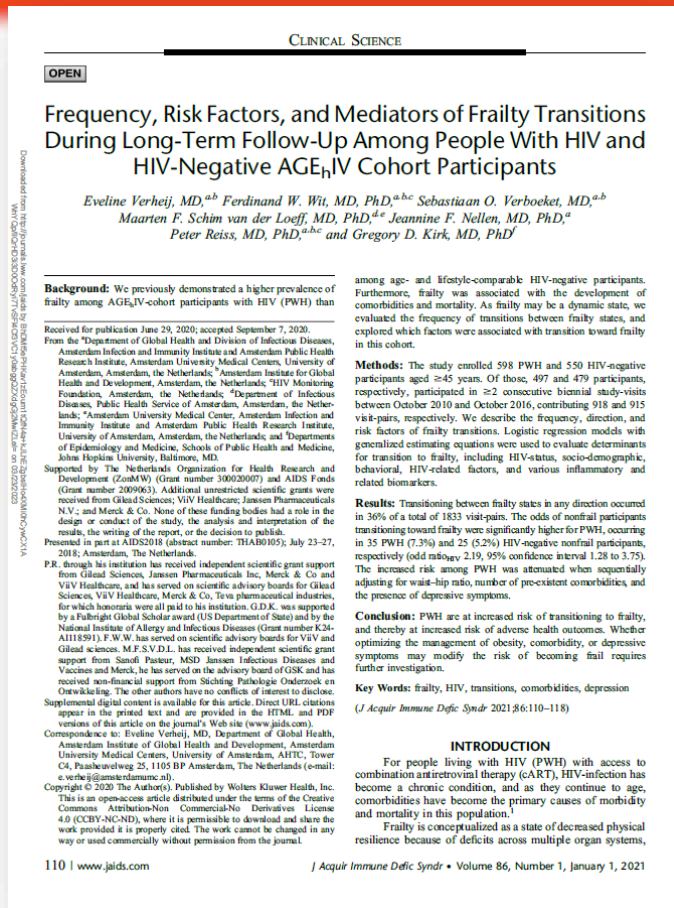
Variable	HR (95% CI)	P Value
Comorbidity		
Smoking	1.41 (1.36-1.46)	<.001
CAD	1.29 (1.24-1.35)	<.001
Diabetes	1.40 (1.34-1.46)	<.001
Hypertension	1.21 (1.16-1.25)	<.001
ESRD	2.78 (2.53-3.05)	<.001
Group comparison		
Low vs Elite	5.04 (4.10-6.20)	<.001
Low vs High	3.90 (3.67-4.14)	<.001
Low vs Above Average	2.75 (2.61-2.89)	<.001
Low vs Below Average	1.95 (1.86-2.04)	<.001
Below Average vs Elite	2.59 (2.10-3.19)	<.001
Below Average vs High	2.00 (1.88-2.14)	<.001
Below Average vs Above Average	1.41 (1.34-1.49)	<.001
Above Average vs Elite	1.84 (1.49-2.26)	<.001
Above Average vs High	1.42 (1.33-1.52)	<.001
High vs Elite	1.29 (1.05-1.60)	.02



ESRD, end-stage renal disease

3. Non_AIDS defining comorbidities -

Incidence of frailty in people living with HIV – and exercise program



A 12-week multicomponent exercise MEP program enhances frailty by increasing robustness, improves physical performance, and preserves muscle mass in older adults with HIV: MOVING study –

Public Health, 17 April 2024 Sec. Aging and Public Health
Volume 12 - 2024 | <https://doi.org/10.3389/fpubh.2024.1373910>

Fátima Brañas – Geriatrics Department, Hospital Universitario Infanta Leonor, Madrid, Spain et al.

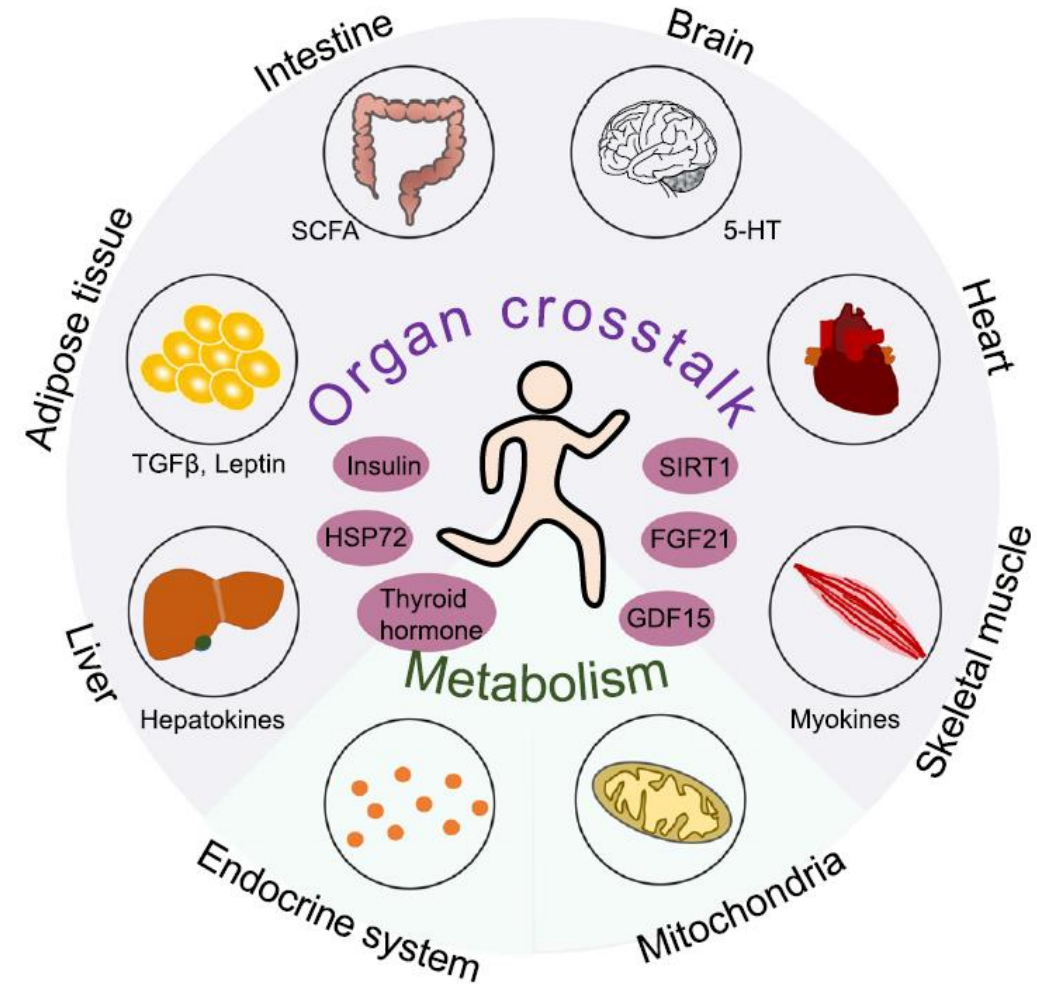
A 12-week MEP enhances frailty by increasing robustness in OAWH, and improves physical performance, and preserves muscle mass in older adults with good adherence to the MEP independently of HIV status. In addition, they found significant improvements in anxiety and depression symptoms after the 12-week

598 PLHIV and 550 HIV-negative participants ≥45 years (AGE_{HIV})

Risk for frailty in HIV: 2.19-fold ↑
(95% CI 1.28 to 3.75)

4. Exercise – physical activities

Exercise sustains the hallmarks of health.



Available online at www.sciencedirect.com
ScienceDirect
 Journal of Sport and Health Science 12 (2023) 8–35

Review
Exercise sustains the hallmarks of health
 Yan Qiu ^{a,b,h,i}, Benjamin Fernández-García ^{c,d,i}, H. Immo Lehmann ^e, Guoping Li ^e,
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Abstract
 Exercise has long been known for its active role in improving physical fitness and sustaining health. Regular moderate-intensity exercise improves all aspects of human health and is widely accepted as a preventative and therapeutic strategy for various diseases. It is well-documented that exercise maintains and restores homeostasis at the organismal, tissue, cellular, and molecular levels to stimulate positive physiological adaptations that consequently protect against various pathological conditions. Here we mainly summarize how moderate-intensity exercise affects the major hallmarks of health, including the integrity of barriers, containment of local perturbations, recycling and turnover, integration of circuitries, rhythmic oscillations, homeostatic resilience, homeic regulation, as well as repair and regeneration. Furthermore, we summarize the current understanding of the mechanisms responsible for beneficial adaptations in response to exercise. This review aimed at providing a comprehensive summary of the vital biological mechanisms through which moderate-intensity exercise maintains health and opens a window for its application in other health interventions. We hope that continuing investigation in this field will further increase our understanding of the processes involved in the positive role of moderate-intensity exercise and thus get us closer to the identification of new therapeutics that improve quality of life.

Keywords: Beneficial effects of exercise; Exercise-related physiological adaptations; Hallmarks of health; Moderate-intensity exercise; Therapeutic exercise

1. Introduction
 While modernization has contributed to increased population longevity, it has also witnessed a continuous rise in non-communicable diseases such as obesity, hypertension, type 2 diabetes, cancer, etc. Non-communicable diseases are now considered “the number one killer” globally, as they lead to more than 80% of deaths in certain countries.^{1,2} The prevalence of non-communicable diseases can be at least partly attributed to insufficient physical activity or exercise.³ According to data from the World Health Organization, in 2016, more than one-quarter of adults worldwide were physically inactive.⁴ The worldwide pandemic of physical inactivity should be a public health priority. It is well-known that a healthy lifestyle is associated with a significantly lower risk of total mortality and a longer life expectancy.⁵ Together with a healthy and adequate dietary pattern, exercise represents a promising strategy for reducing the risk of chronic metabolic and

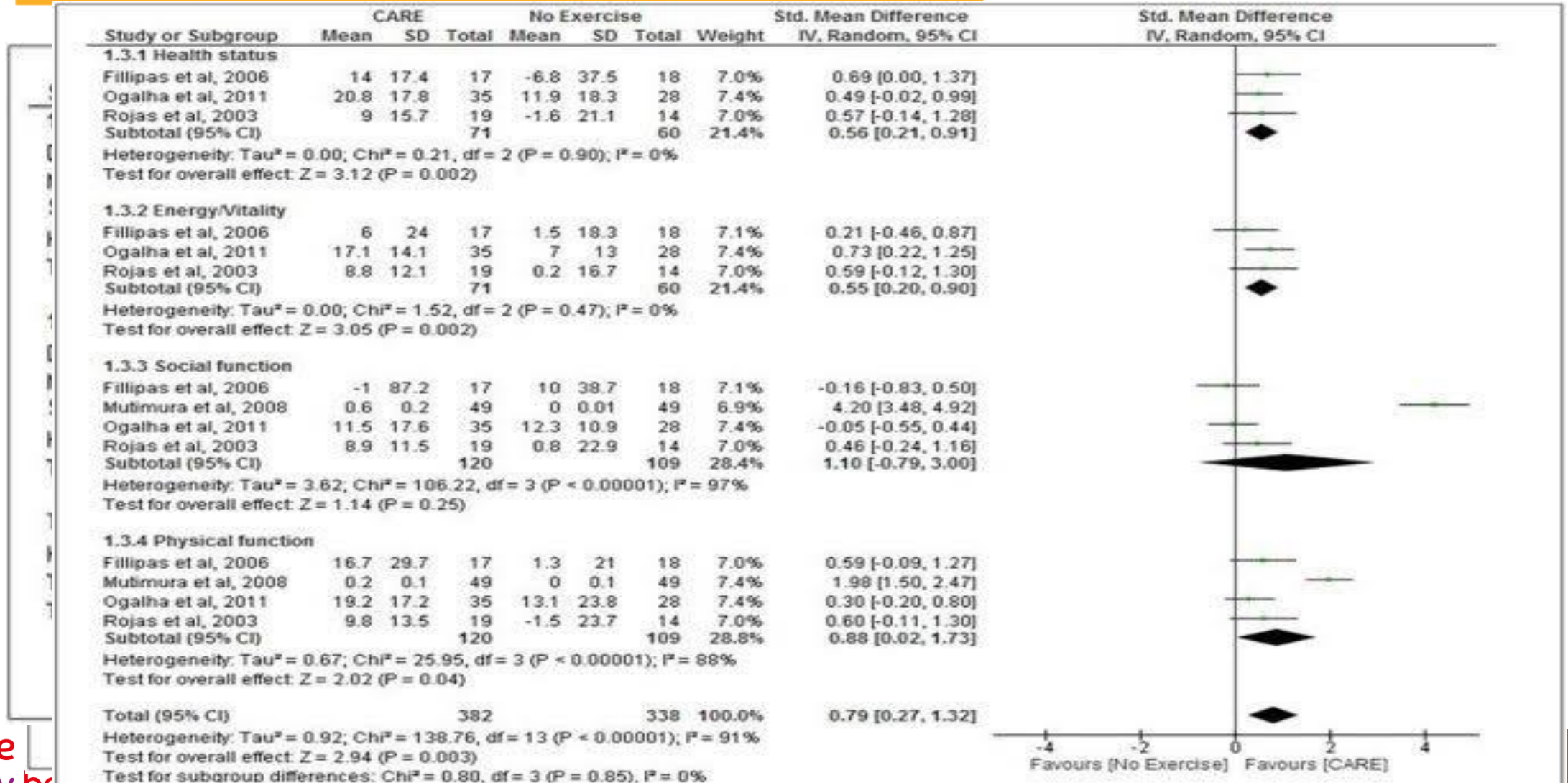
Peer review under responsibility of Shanghai University of Sport.
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<https://doi.org/10.1016/j.jshs.2022.10.003>
 Cite this article: Qiu Y, Fernández-García B, Lehmann H, et al. Exercise sustains the hallmarks of health. *J Sport Health Sci* 2023;12:8–35.

4. Exercise – physical activities

The effects of exercise training

combined aerobic and resistance exercise (CARE)



4. Exercise – physical activities

The effects of exercise training

The Impact of Moderate or High-Intensity Combined Exercise on Systemic Inflammation Among Older Persons With and Without HIV - Kristine M. Erlandson et al.

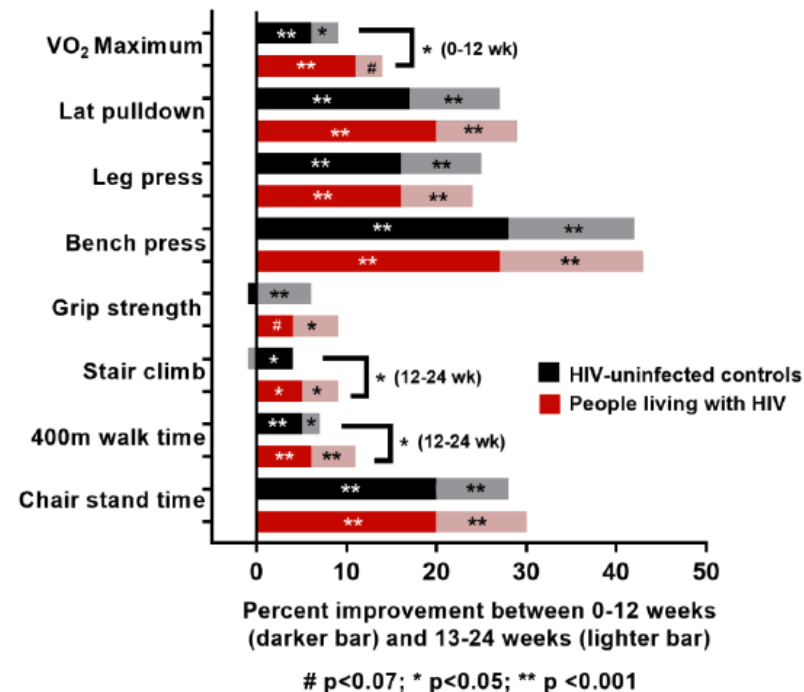
Exercise and Inflammation in HIV • The Journal of Infectious Diseases 2021:223 (1 April) •

People with HIV have Similar or Greater Improvements in Function with Exercise

- Exercise for Healthy Aging (NIA K23, 2014-2019) 70 people with and without HIV, aged ≥ 50 years
 - 12 weeks moderate intensity exercise
 - Randomized to 12 additional weeks of moderate or high exercise intensity
- **10-45% improvement in both groups**
 - **People with HIV experienced greater gains in 400-m walk time, stair climb, VO2 max**

Physical Function Findings:

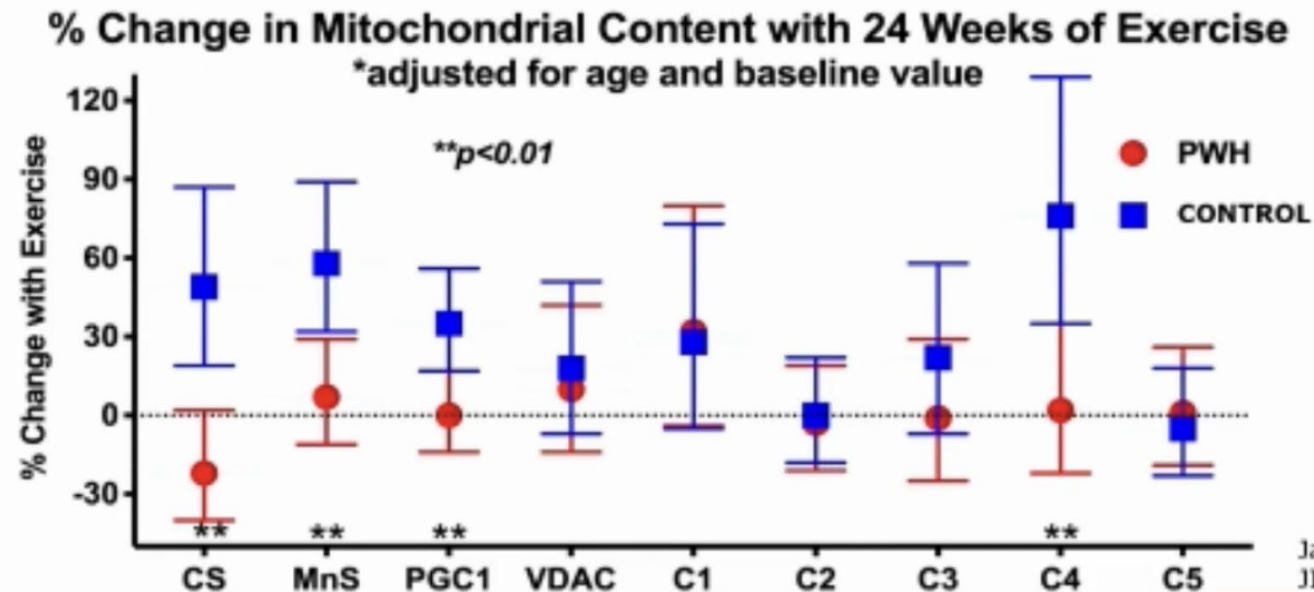
Percent Improvement in Functional Measures with 12 and 24 Weeks of Cardiovascular and Resistance Exercise (Moderate/High Intensity Combined)



4. Exercise – physical activities

The effects of exercise training

Differing Exercise Response at the Tissue Level in Some (not all) Markers



PWH failed to increase many markers of **mitochondrial function** in response to exercise:
Are different types of exercise or adjuvant therapies needed?
Does this impact fatigue and can it impact longer-term adherence?

4. Exercise – physical activities

The effects of exercise training

Do These Findings Change Our Recommendations for Exercise in Older PWH?



- Older adults with HIV have similar if not greater improvements in physical function with exercise
- Higher-intensity exercise may result in further improvements in measures of strength
- Based on poor uptake of physical activity, blunted improvements in IL-10 & mitochondrial protein content, stable epigenetic age, and lack of long-term adherence, **adjuvant therapies may be needed**

22 – 26 July - Munich, Germany and virtual

aids2024.org



Kristine Erlandson



4. Exercise – physical activities

The effects of exercise training

Effectiveness of aerobic exercise for adults living with HIV: systematic review and meta-analysis using the Cochrane Collaboration protocol

[Kelly K. O'Brien](#) et al *BMC Infectious Diseases* volume 16, Article number: 182 (2016)

Research Question

What is the effectiveness of aerobic (AER) and/or progressive resistive exercise (PRE) on...

- Immunological and virological
- Cardiopulmonary
- Weight and body composition
- Strength and
- Psychological outcomes

..in adults living with HIV?



Results – Characteristics of Included Studies

Characteristics	Aerobic Exercise Review	Resistive Exercise (PRE) Review
# studies met inclusion criteria	24 studies	20 studies
14 studies overlap (PRE+AER; or PRE versus AER versus no exercise)		
# participants @ baseline	1242 participants	959 participants
Mean age range (years)	30-49 years	32-49 years
% women @ completion	22%	23%
Withdrawal rate	~24% (0-76%)	~20% (0-38%)
% studies published ≥1996	20 (83%)	17 (85%)
Length of intervention	5 to 52 weeks	6 to 52 weeks
Supervised exercise	18 (75%)	17 (85%)
# meta-analyses performed	58	34

4. Exercise – physical activities

The effects of exercise training

Effectiveness of aerobic exercise for adults living with HIV: systematic review and meta-analysis using the Cochrane Collaboration protocol

[Kelly K. O'Brien](#) et al *BMC Infectious Diseases* volume 16, Article number: 182 (2016)

Quality of life: SF36 questionnaire (AER)

Aerobic (or AER+PRE) versus No Exercise

Domain	Weighted Mean Difference (WMD) (95% CI)	
General Health	4.73 (3.13, 9.75)	
Mental Health	11.58 (1.35, 21.81)	
Role Physical	6.56 (3.17, 9.96)	
Role Emotional	10.95 (8.19, 13.71)	Clinically Important Improvement
Pain	-6.59 (-9.83, -3.36)	
Physical Function	16.30 (6.89, 25.72)	
Energy / Vitality	5.03 (1.33, 8.72)	
Social Function	2.73 (-4.84, 10.30)	

Statistically significant improvement on 6 out of 8 SF36 domain **QOL sub-scales** for exercisers compared with non-exercisers (n=59; 2 studies).

Health-related quality of life

Meta-analyses were performed for the eight sub-scales of the SF-36 questionnaire . Results demonstrated statistically significant and clinically important improvements (>10 point change) on

- mental health, role emotional and physical functioning, role physical, general health, and energy/vitality sub-scale scores for participants in the aerobic or combined aerobic and PRE group compared with participants in the non-exercising control group.

7. My summary and my view



ART

- Early diagnosis & therapy
- Contemporary ART
- Stop HIV replication
- Prevent mutation development

ART⁺

- Comorbidities
 - screen
 - treat
 - prevent
- Long term health

ART+

- Comorbidities
 - Stop smoking
 - Weight control
 - Physical Activities - Exercise
- Long term health & quality of life

HIV Centers

HIV Organisations

Early

L a t e r

Webinars Well-being and Physical activity:

NEEDS ASSESSMENT : Principal health challenges, barriers to physical activity and links to HIV+ status

12th BREACH Symposium

Well-being and physical activity through webinars: participatory needs assessment of people living with HIV (PLHV)

authors: Yagos Kollopanos & Axel Vanderperre

Objectives:
Carry out a needs assessment survey to examine the physical activity and well-being needs of people living with HIV (PLHV), along with their views on online training programs.
Evaluate a range of health outcomes and address modifiable risk factors in order to prevent physical and psychological comorbidities in older individuals living with HIV.

KEY QUESTIONS AND NUMBERS

On a scale of 1 to 10 how do you rate your health condition on average? **5.7/10**

Do you attribute your health issues to HIV? **Yes 48%**

Do you attribute your physical activity barriers to HIV? **Yes 50%**

What do you consider to be the reasons for your physical inactivity? **Lack of financial resources 54%**
Lack of community resources 50%

METHOD

Methodological specificities:

- Questionnaire survey; 50% response rate of PLHV (n = 32) who participated at the 5th National Day Positive Health HIV(Brussels, 21 September 2024)

Inclusive approach:

This public health survey employs a community-engaged approach that includes people living with HIV, a sociologist as well as physical activity and well-being providers.

ACKNOWLEDGEMENTS

Survey supported by an unrestricted grant from GILEAD and ViiV.

CONTEXT / BACKGROUND

- Well-being and physical activity interventions have gained increasing importance for PLHV in recent years, owing to their beneficial effects on physical, mental and social health outcomes: regular exercise can lead to improvements in cardiopulmonary fitness, strength, body composition and mental health among PLHV (O'Brien et al. 2017).
- Benefits of physical activity have also been shown with women living with HIV and older adults living with HIV (Dolan et al. 2004) and physical activity has also been associated with enhancements to physical health (Cloe et al. 2019), metabolic outcomes (Games-Neto et al. 2013; Trevisol et al. 2012; Zech et al. 2019), cognitive health (Quigley et al. 2019), social support and quality of life among adults living with HIV (Clingerman et al. 2004; Martin et al. 2019).
- Recent studies show that there is a need for adjuvant therapies addressed to PLHV: mixed interventions (physical activity combined with techniques such as respiration and visualisation) are highly beneficial to PLHV and particularly older adults (Erlanson 2024).
- Literature review shows that both in terms of logistics (time limitations, access to facilities) and stigma/discrimination issues, online interventions such as home-based or digitally delivered programs can be effective solutions to these barriers, making physical activity more accessible for PLHV.
- Based on our findings, we decided to conduct a questionnaire survey in the context of the annual National Positive Health HIV day held in Brussels on 21/09/2024 and including physical activity and well-being workshops. The questionnaire was distributed to 32 PLHV who participated and completed by 16 PLHV amongst them.

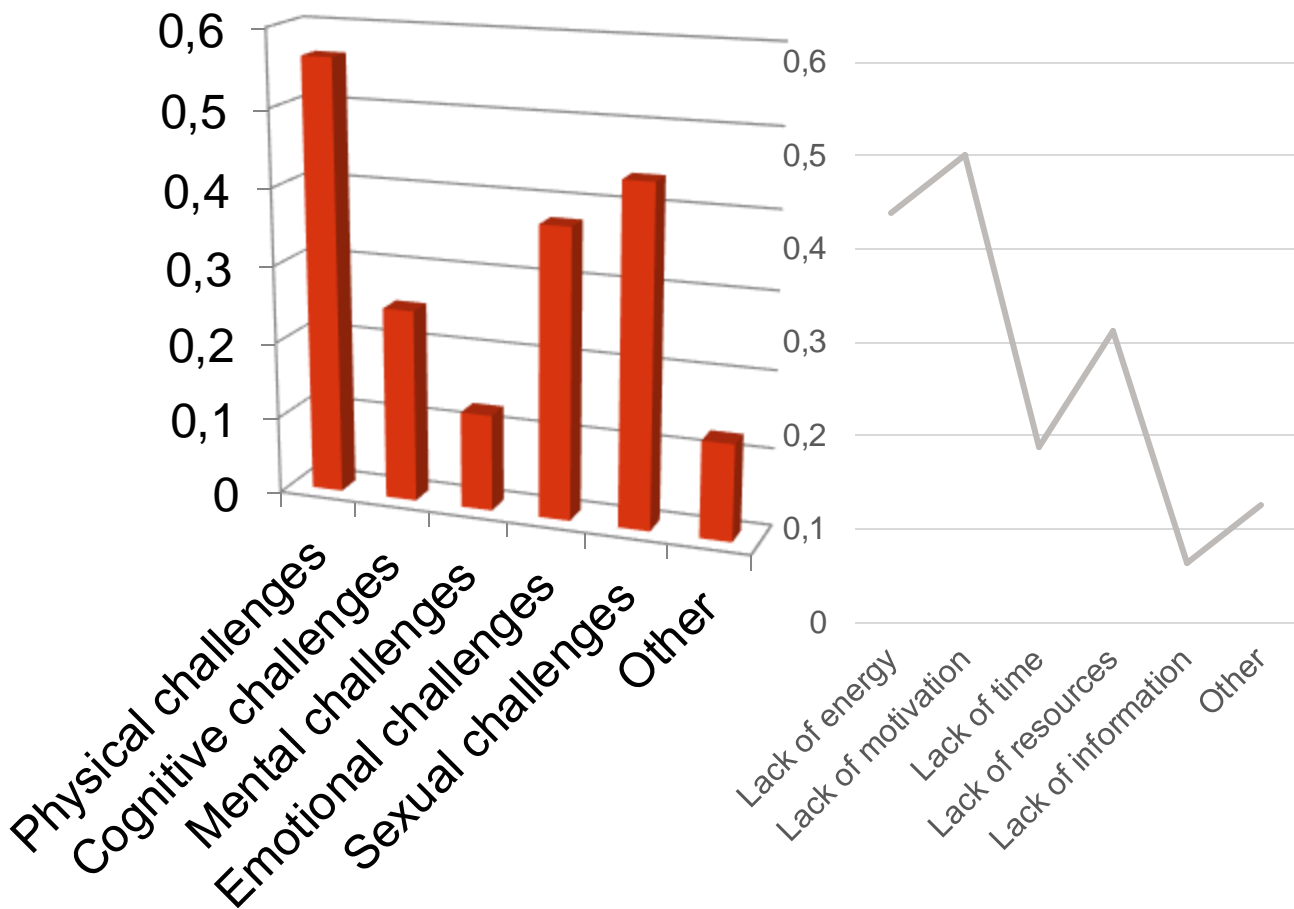
RESULTS

- The health status of PLHV is generally average to poor, particularly in terms of **relational** and **sexual health**.
- The primary obstacles to engaging in regular physical activity according to the respondents are a **lack of motivation** (50%) and a **lack of energy** (43%).
- PLHV predominantly attribute the **obstacles** that they face in obtaining **regular and satisfactory physical activity** to their **serological status**.
- In a similar fashion, PLHV primarily associate their various **health issues** with their **serological status**.
- Despite a relatively high level of education, the respondents primarily cite **financial** and **community**

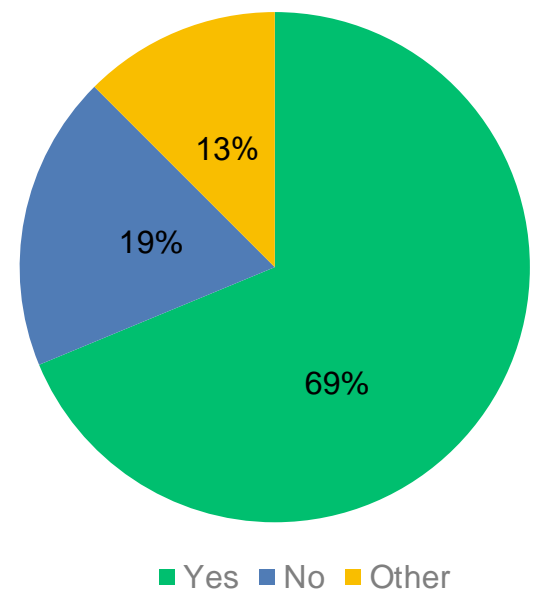
Poster BREACH 2024

Supported by Gilead and ViiV

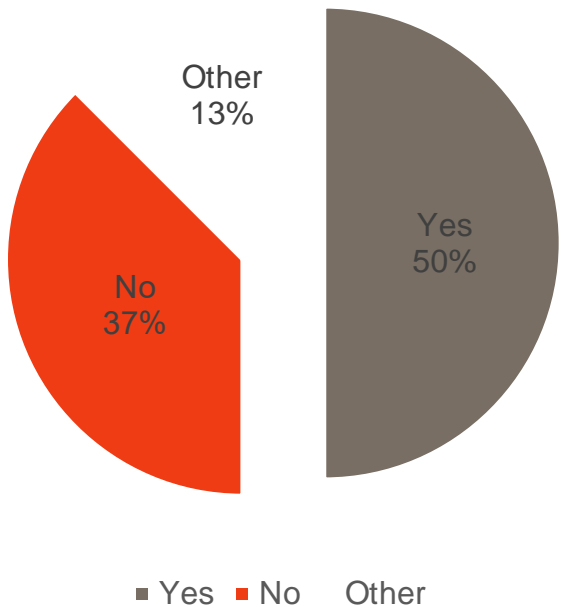
NEEDS ASSESSMENT : Principal health challenges, barriers to physical activity and links to HIV+ status



Challenges attributed to HIV?



Barriers attributed to HIV?



WEBINARS “Physical Activity, Respiration & Visualisation”

OCT –NOV – DEC 2024

Webinaires : octobre, novembre, décembre 2024 - PROGRAMME D'EXERCICES

1. ÉTIREMENTS / FORCE : Entre 3-5x/semaine

Étirements 15 secondes chaque.

Tête (étirements)	6	15 secondes	Pas besoin de repos entre les étirements
Épaules (mobilisations)	2	15 répétitions vers l'avant et vers l'arrière	Selon le besoin
Bras (renforcement) debout ou assise	6	3x10	30-60 secondes
Tronc (Couché sur le ventre)	1	3x10	30-60 secondes
Tronc (quatre pattes)	2	3x10	30-60 secondes
Tronc (couché sur le dos)	1	3x10	30-60 secondes
Tronc (debout)	1	3x10	30-60 secondes



Webinaires : octobre, novembre, décembre 2024 - PROGRAMME D'EXERCICES

3. Exercices de respiration :

J1 : prise de conscience de votre respiration (2 ou 3 minutes) + respiration abdominale, costale et pectorale (3 minutes par étage).

J2 : prise de conscience de votre respiration (2 ou 3 minutes).

J3 : prise de conscience de votre respiration (2 ou 3 minutes) + Respiration abdominale, costale et pectorale + Test BOLT (3 minutes).

4. Pour la visualisation:

J1: Sophronisation de base (SB). Audio <https://youtu.be/kULMIXmaQo>

J3: Sophronisation de base (SB): Audio <https://youtu.be/kULMIXmaQo>

et Évacuation des tensions inutiles: Audio <https://youtu.be/texF8JmMcV4>



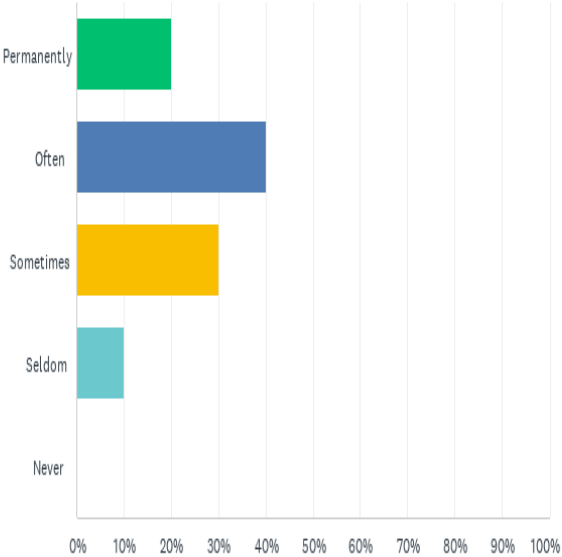
Une initiative d'Utopia_BXL , avec l'aide de l'Observatoire du Sida et des Sexualités avec le support de GILEAD et Viiv

2. Exercices d'aerobies (suggestions)

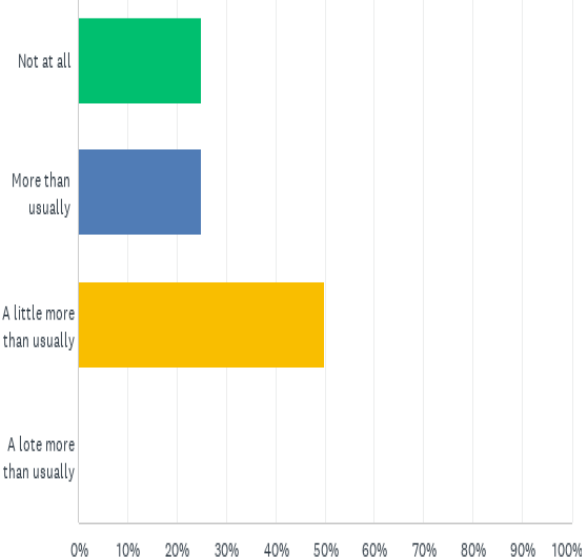
Entre 2-4x/semaine durant 15-25 min

Pilot Programme Webinars “Well-being and physical activity” : questionnaires on vitality, general health and physical activity answered by PLHIV participants

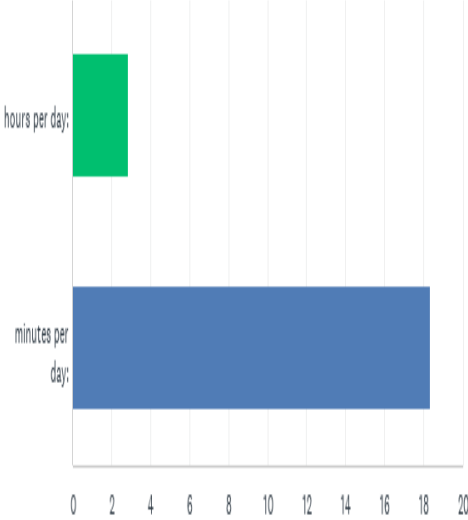
Q4 Over the past 4 weeks, how tired have you felt?



Q5 Over the past few weeks, have you felt constantly stressed?



Q6 In total, how much time have you spent walking in the last 7 days?



Physical Activity
General Health
Vitalité - VT - SF-36

WEBINARS oct-nov-dec 2024 “Physical Activiyy and Well-being”

Supported by grant by Gilead and ViiV

Strength

- Clear, pedagogical videos focused on demonstration.
- Webinars designed by experts HCPs.
- Potential for individualized coaching

Weakness

- Lack of human interaction in webinars.
- Home exercise requires strong discipline.
- Digital barriers for some participants.



Threat

- Reliance on technology excludes some.
- Cultural resistance to adopting routines.
- Difficulty maintaining long-term efforts.

Opportunity

- In-person workshops to enhance interaction.
- Tailored coaching to meet individual needs.
- Addressing effects of HIV treatments

Exercise Is Medicine

