Bénéfices de l'activité physique chez le patient atteint de cancer

Dr Laura SERRANO

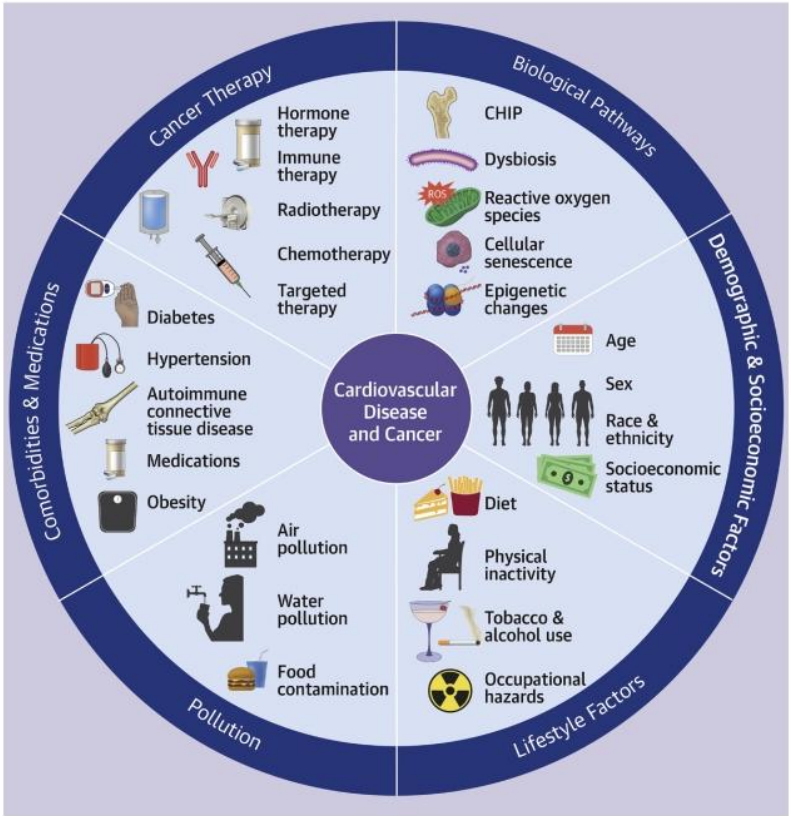
Cardiocéan

La Rochelle

Le 13 03 2026

Aucun conflit d’intérêt

CENTRAL ILLUSTRATION: Drivers of the Cancer-Cardiovascular Disease Bidirectional Relationship

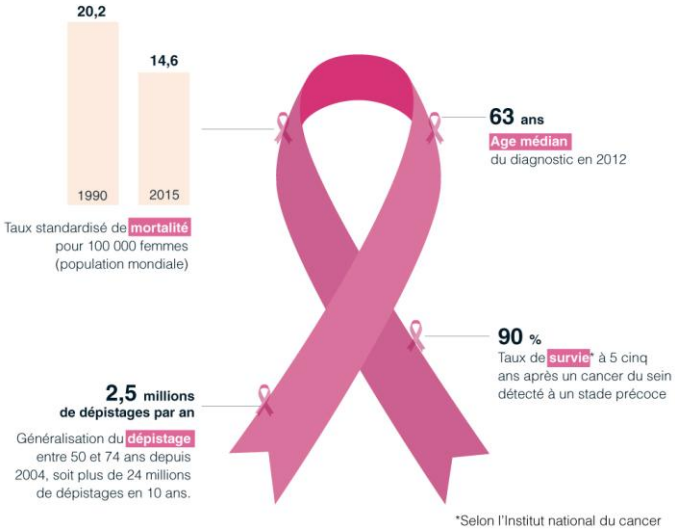


Alhuneafat L, et al. JACC CardioOncol. 2025;7(5):453-469.

Cancer and Cardiovascular Disease: Shared Risk Factors, Mechanisms, and Clinical Implications: JACC: CardioOncology State-of-the-Art Review.Alhuneafat L., Guha A. Blaes A. and al. JACC CardioOncol. 2025 Aug;7(5):453-469. doi: 10.1016/j.jaccao.2025.07.001.

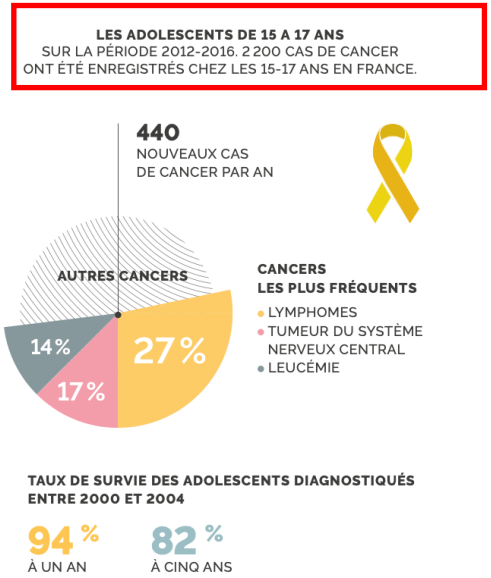
Epidémiologie: cancer TTT par anthracyclines

61214 cas 2023



Lymphomes « adultes »
30 000cas par an 2018
27645 cas LNH
2127 LH
(1990: 12727 LNH, 1374 LH)

6ieme rang incidence cancer
9ieme mortalité
Age médian 65 ans/70ans LNH
20/25 ans LH



1 femme / 8 aura un cancer du sein

Hausse chez les jeunes
Baisse chez > 50ans

1. INCa Panorama des cancers en France - édition 2023

2. Info cancer 2024

AMERICAN COLLEGE of CARDIOLOGY

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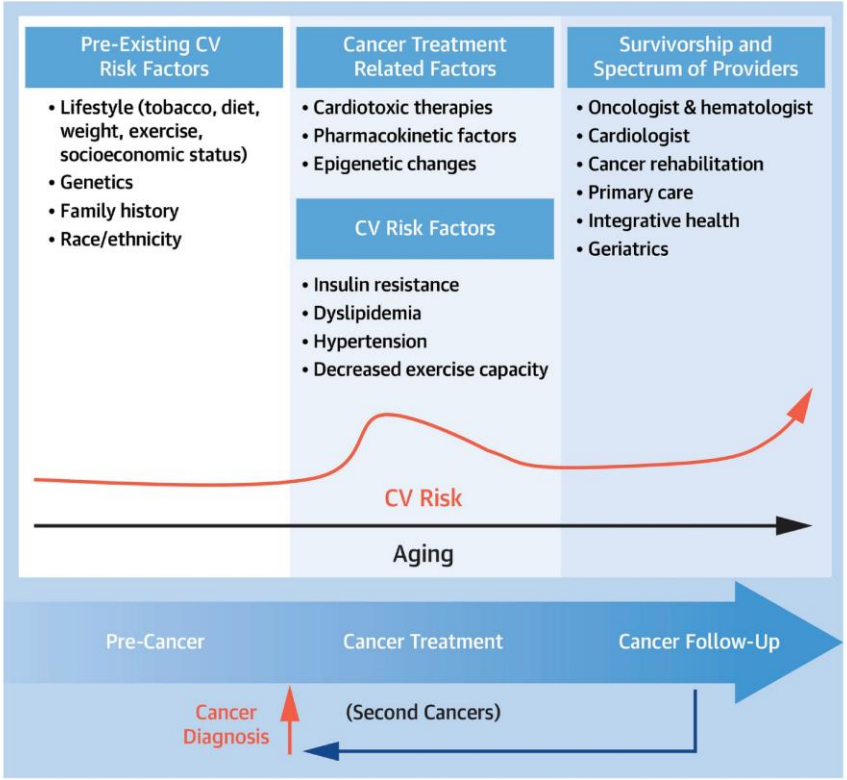
JACC: CardioOncology Expert Panel Addresses CV Care After Cancer Therapy

Jan 29, 2025

CENTRAL ILLUSTRATION: Cancer Trajectory Across the Lifespan

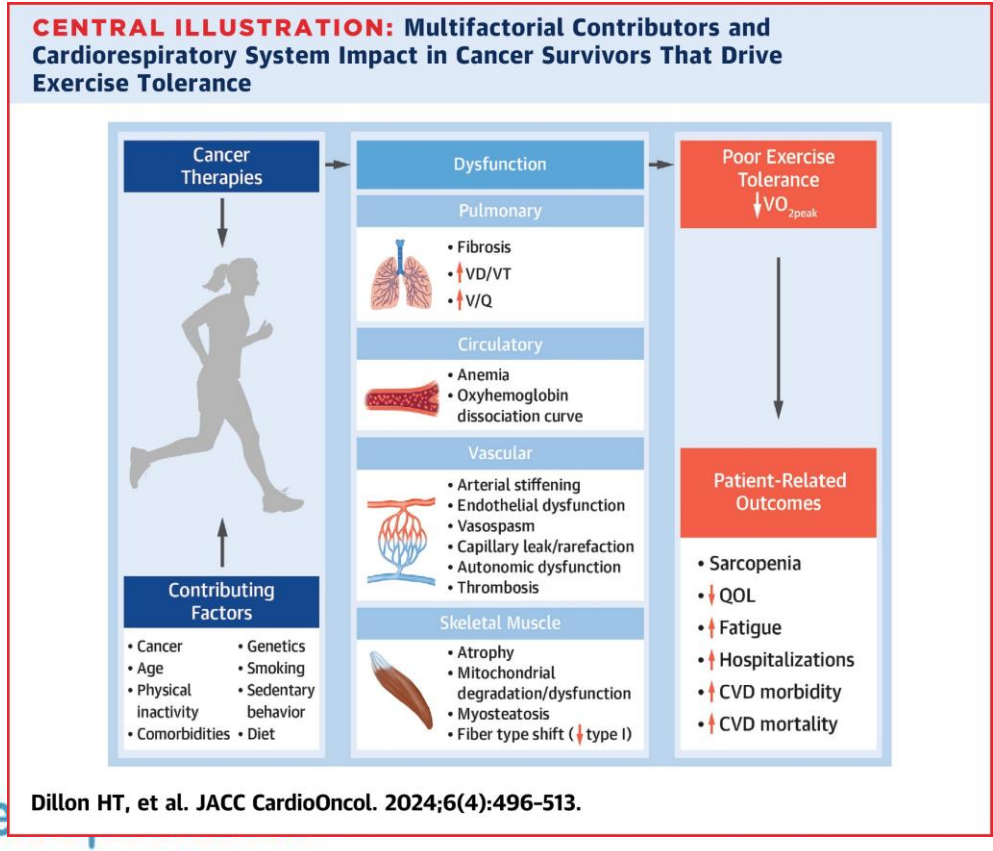


Blaes A, et al. JACC CardioOncol. 2025;7(1):1-19.

Intolérance à l'exercice survivant du cancer

L'intolérance à l'exercice = marqueur important sous-estimé, de l'augmentation du risque cardiovasculaire et des limitations fonctionnelles chez les survivants du cancer

Traditionnellement, les **altérations du pic $_{de}$ VO2** attribuées à:
- Limitations cardiaques
- Mais traitements anticancéreux actuels et émergents induisent une **altération substantielle des composantes non cardiaques de l'absorption, du transport et de l'utilisation de l'oxygène.**



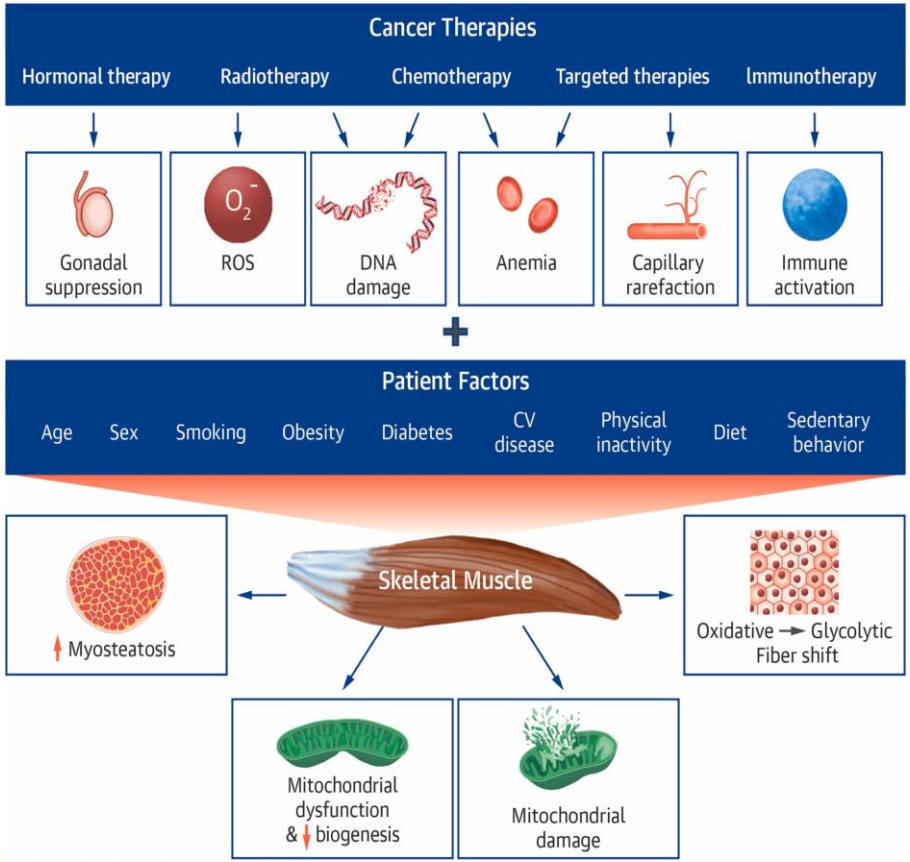
Dillon HT, et al. JACC CardioOncol. 2024;6(4):496-513.

Intolérance à l'exercice survivant du cancer

Dysfonctionnement des muscles squelettiques
Lié au ttt anti cancéreux
Lié aux FDRCV du patient

- **Plusieurs voies entrainent un dysfonctionnement mitochondrial et myocytaire et contribuent** contribuent au dysfonctionnement des muscles squelettiques chez les patients atteints de cancer.

- **Dysfonctionnement des muscles squelettiques est multifactoriel et peut entraîner une intolérance à l'effort et augmenter le risque d'insuffisance cardiaque.**



Dillon HT, et al. JACC CardioOncol. 2024;6(4):496-513.

Pic de VO2 et cancer du sein

VOLUME 30 · NUMBER 20 · JULY 10 2012

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Cardiopulmonary Function and Age-Related Decline Across the Breast Cancer Survivorship Continuum

Lee W. Jones, Kerry S. Courneya, John R. Mackey, Hyman B. Muss, Edith N. Pituskin, Jessica M. Scott, Whitney E. Hornsby, April D. Coan, James E. Herndon II, Pamela S. Douglas, and Mark Haykowsky

Listen to the podcast by Dr Schwartz at www.jco.org/podcasts

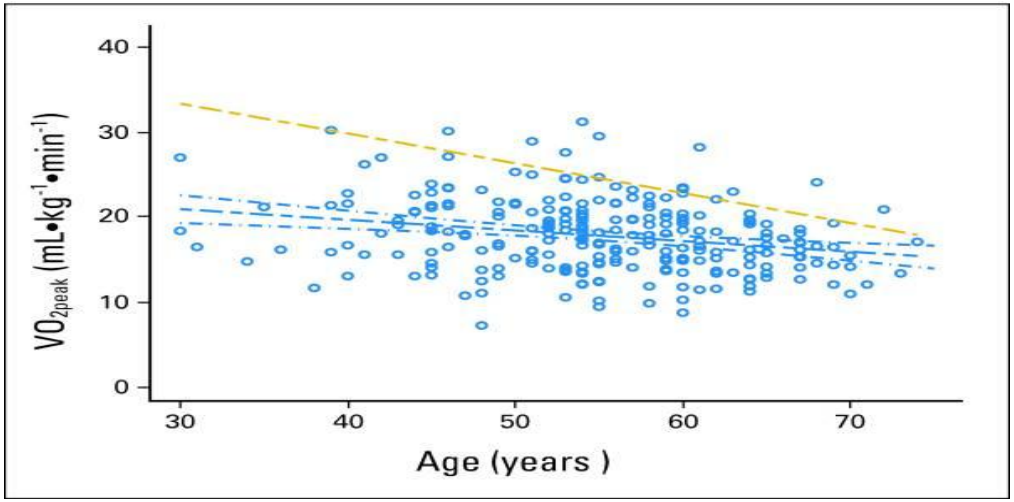
Objectif :

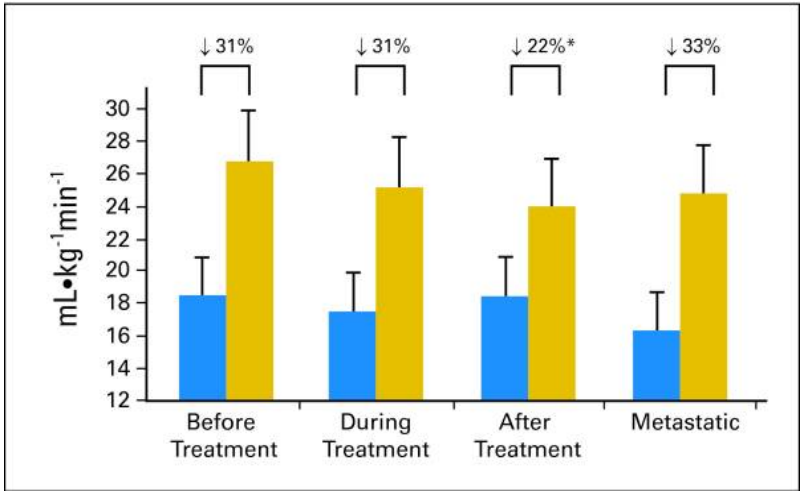
- Évaluer la fonction cardiopulmonaire (mesurée par le VO_2peak) chez des femmes atteintes de cancer du sein à différentes étapes du parcours de survie (diagnostic, traitement, post-traitement, maladie métastatique).

Méthode :

- 248 femmes
- Test d'effort cardiopulmonaire (CPET)
- Mesure **VO_2peak**

Pic de VO2 et cancer du sein





Pic moyen de VO2
40 ans 19,7ml/kg/min
70 ans sans cancer 19,3ml/kg/min

Pic de VO2 moyen 17,8 ± 4,3 mL · kg−1 · min−1
= inférieur de 27 % femmes sédentaires, appariées du même âge bonne santé sans carcinome mammaire

1/3 femmes ont un pic de VO2 inferieur au pic d'indépendance fonctionnelle 15ml/kg/min

Cardiopulmonary Function and Age-Related Decline Across the Breast Cancer Survivorship Continuum. Jones, Courneya et al. J Clin Oncol. 2012

Risque MCV post-traitement cancer du sein

MCV grèvent le pronostic + que la récidive du cancer

- **1,3 à 3,6 fois plus de risque mortalité CV** /non ttt pour cancer

- 1,7 à **18,5 fois plus de FDRCV** (HTA, diabète, dyslipidémie) / non ttt pour cancer *(1,2,3)*

5 kg suppl. ➔ 19% ⬆️ risque de MCV *(1,2,3)*

1.Jones LW. Early breast cancer therapy and cardiovascular injury. J Am Coll Cardiol. 2007;50:1435-1441 2. Juter TM, Ewer MS. Cancer drugs and the heart : importance and management. Eur. Heart J. 2013;34:1102-111. 3. Al-kindi SG, Oliveira GH. Prevalence of preexisting cardiovascular disease in patients with differents types of cancer : the unmet need for onco-cardiology. Mayo Clin. Proc 2016;91:81-3.

Fréquence de la pratique de l'AP chez les AJA ou survivant AJA?

J Cancer Surviv. 2023 June ; 17(3): 848–858. doi:10.1007/s11764-022-01264-2.

Disparities in Physical Activity in Adolescent and Young Adult Cancer Survivors

Amy M. Berkman, MD[1], **Clark R. Andersen, MS**[2], **Kevin Tang, BS**[3], **Susan C. Gilchrist**[*,4], **Michael E. Roth, MD**[*,5]

[1]Department of Pediatrics, Duke University School of Medicine, Durham, NC, USA

[2]Department of Biostatistics, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

[3]Albert Einstein College of Medicine, Bronx, NY, USA

[4]Cardiovascular Clinical Trials, LabCorp Drug Development, Princeton, NJ, USA

[5]Division of Pediatrics, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

AP autodéclarées de l'Enquête nationale sur la santé EU (2009-2018)

Identifier les survivants du cancer AJA (au moins 2 ans après le diagnostic) et les témoins appariés selon l'âge et le sexe

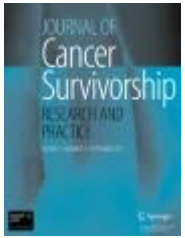
4,766 AJA survivants vs 47,660 patients contrôle

AP modérée à vigoureuse (APMV) est un facteur modifiable important associé à une meilleure santé cardiovasculaire.

Table 1.

Characteristics of 4,766 adolescent and young adult cancer survivors and 47,660 matched controls identified in the National Health Information Survey, years 2009-2018

	AYA Survivors	Controls	
Characteristic	**N (Weighted %)**	**N (Weighted %)**	**p-value**
Age, years			0.58
Mean±SD	50.9±14.6	50.7±15.0	
Median (IQR)	50 (40-64)	51 (40-62)	
Sex			0.07
Male	1,174 (25.9)	11,414 (24.5)	
Female	3,592 (74.1)	36,246 (75.5)	
Race/Ethnicity			0.27
Asian	92 (1.7)	906 (1.5)	
Black	360 (6.6)	3,379 (5.9)	
Hispanic	421 (6.8)	4,222 (6.6)	
Other	154 (3.0)	1,572 (2.8)	
White	3,739 (81.9)	37,581 (83.2)	
Household Income			**<0.001**
>50K/year	2,234 (48.8)	24,306 (52.8)	
<50K/year	2,532 (51.2)	23,354 (47.2)	
Education			**0.002**
Bachelor's degree or higher	1,417 (31.7)	15,391 (34.1)	
High school graduate	2,845 (58.5)	27,690 (57.4)	
<High school	504 (9.8)	4,579 (8.5)	
Diabetes			**0.006**
No	4,290 (90.1)	43,423 (91.5)	
Yes	476 (9.9)	4,237 (8.5)	
Heart Disease			**<0.001**
No	4,437 (93.3)	45,718 (96.0)	
Yes	329 (6.7)	1,942 (4.0)	
Stroke			**<0.001**
No	4,469 (93.9)	46,246 (97.1)	
Yes	297 (6.1)	1,414 (2.9)	
Smoking Status			**<0.001**
Never smoker	2,259 (48.2)	27,238 (56.8)	
Former smoker	1,280 (26.7)	11,353 (24.2)	
Current smoker	1,227 (25.1)	9,069 (18.9)	
MVPA[#] (MET-min/week)			**
Mean±SD	1,377±2,634	1,384±2,658	
Median (IQR)	480 (0-1,680)	540 (0-1,680)	
Log_2 (MVPA[#]+1)			



Fréquence de la pratique de l'AP chez les AJA ou survivant AJA?

- **<u>Moins de la moitié des survivants et des témoins atteignaient les recommandations MVPA</u>**
  = 41,9 % des survivants vs 43,2 % des témoins

- **Environ 1/3 des survivants ne pratiquaient pas de MVPA du tout (33,4 %)**

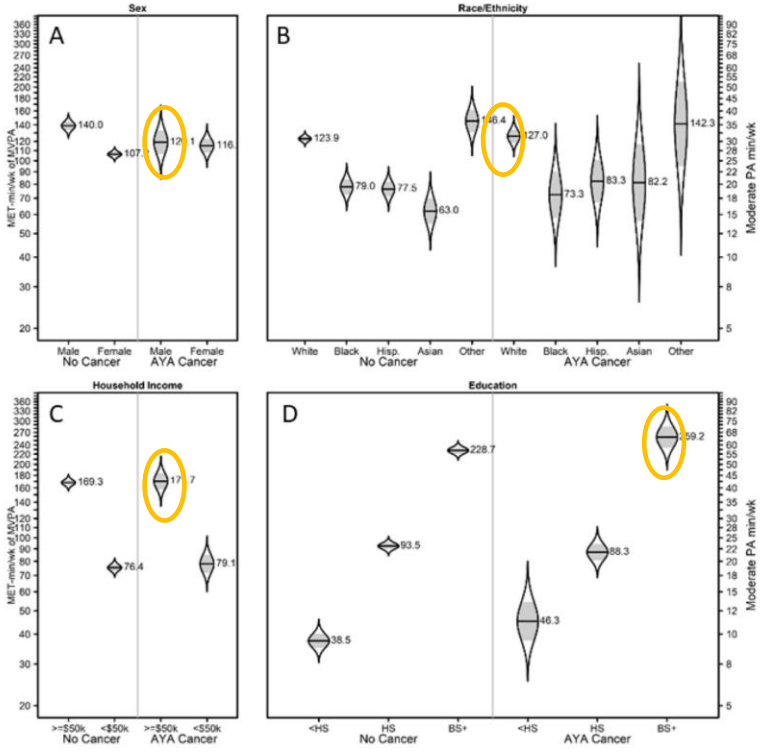


Figure 1.
MET-min/week of MVPA and corresponding min/week of moderate PA with relation to: sex (A), race and ethnicity (B), household income (C), and education (D), by cancer group. Catseye plots illustrate the normal distributions of the model-adjusted means, with shaded +/− standard error intervals.

Fréquence de la pratique de l'AP chez les AJA ou survivant?

Les survivants AJA ayant maladie Cardiaque ont signalé environ 55 % de MET-minutes/semaine de MVPA en moins / contrôles

•Comparaison survivants vs contrôles:

- Aucune différence nette de MVPA entre survivants et contrôles selon les facteurs sociodémographiques, antécédents médicaux et facteurs de risque cardiovasculaire.
- **Chez les deux groupes, les mêmes déterminants socio-économiques et médicaux modulaient la MVPA: faible revenu, faible éducation, IMC élevé et comorbidités (diabète, maladie cardiaque) et tabagisme associé à des MVPA plus faibles**
- **➔ interventions ciblées dans ces populations**

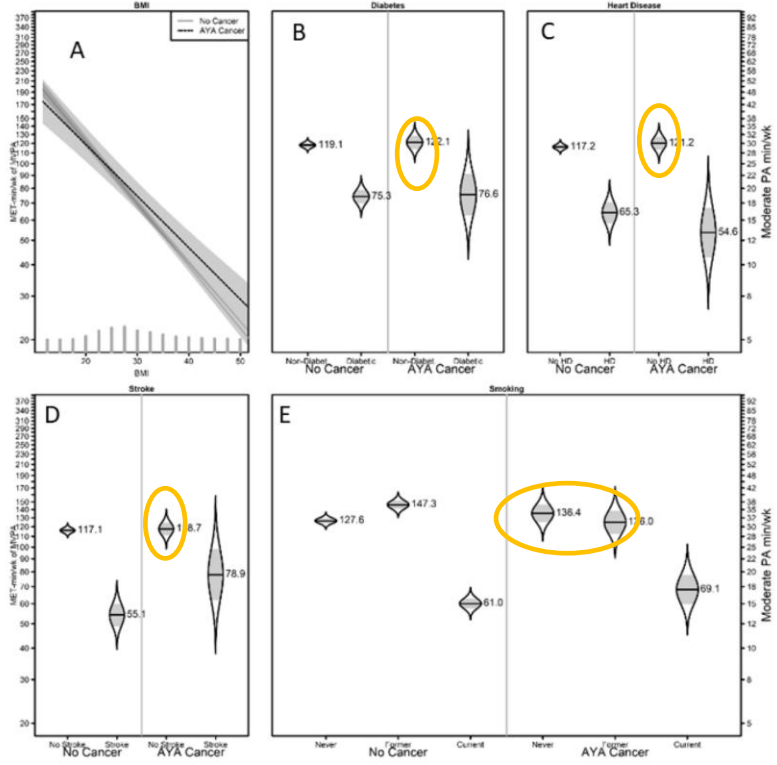


Figure 2.
MET-min/week of MVPA and corresponding min/week of moderate PA with relation to: BMI (A), diabetes (B), heart disease (C), stroke (D), and smoking status (E) by cancer group. Catseye plots illustrate the normal distributions of the model-adjusted means, with shaded +/− standard error intervals. A histogram is shown at the bottom of the figure (A) to illustrate observed frequencies of measures.

Recommandations de pratique de l'AP en oncologie

Effects of Exercise on Health-Related Outcomes in Those with Cancer

What can exercise do?

- **Prevention of 7 common cancers***
  Dose: 2018 Physical Activity Guidelines for Americans: 150-300 min/week moderate or 75-150 min/week vigorous aerobic exercise
- **Survival of 3 common cancers****
  Dose: Exact dose of physical activity needed to reduce cancer-specific or all-cause mortality is not yet known; Overall more activity appears to lead to better risk reduction

*bladder, breast, colon, endometrial, esophageal, kidney and stomach cancers
**breast, colon and prostate cancers

	Dose	Dose
0 min per session of ensity	**2x**/week of **2** sets of **12-15** reps for major muscle groups at moderate intensity	**3x**/week for **30** min per session of moderate aerobic exercise, plus **2x**/week of resistance training **2** sets of **12-15** reps for major muscle groups at moderate intensity
30-60 min per session of	**2x**/week of **2** sets of **8-15** reps for	**2-3x**/week for **20-30** min per session of moderate aerobic exercise plus

Physical Function	**3x**/week for **30-60** min per session of moderate to vigorous	**2-3x**/week of **2** sets of **8-12** reps for major muscle groups at moderate to vigorous intensity	**3x**/week for **20-40** min per session of moderate to vigorous aerobic exercise, plus **2-3x**/week of resistance training **2** sets of **8-12** reps for major muscle group at moderate to vigorous intensity
Anxiety	**3x**/week for **30-60** min per session of moderate to vigorous	Insufficient evidence	**2-3x**/week for **20-40** min of moderate to vigorous aerobic exercise plus **2x**/week of resistance training of **2** sets, **8-12** reps for major muscle groups at moderate to vigorous intensity
Depression	**3x**/week for **30-60** min per session of moderate to vigorous	Insufficient evidence	**2-3x**/week for **20-40** min of moderate to vigorous aerobic exercise plus **2x**/week of resistance training of **2** sets, **8-12** reps for major muscle groups at moderate to vigorous intensity
Lymphedema	Insufficient evidence	**2-3x**/week of progressive, supervised program for major muscle groups does not exacerbate lymphedema	Insufficient evidence
Moderate Evidence			
Bone health	Insufficient evidence	**2-3x**/week of moderate to vigorous resistance training plus high impact training (sufficient to generate ground reaction force of **3-4** time body weight) for at least **12** months	Insufficient evidence
Sleep	**3-4x**/week for **30-40** min per session of moderate intensity	Insufficient evidence	Insufficient evidence

Citation: bit.ly/cancer_exercise_guidelines

Moderate intensity (40%-59% heart rate reserve or VO_2R) to vigorous intensity (60%-89% heart rate reserve or VO_2R) is recommended.

ACSM MOVING THROUGH CANCER | ACSM EXERCISE IS MEDICINE®

Med Sci Sports Exerc. 2010 Jul;42(7):1409-26. doi: 10.1249/MSS.0b013e3181e0c112.

SIO Society for Integrative Oncology

ASCO® Guidelines

INTEGRATIVE ONCOLOGY CARE OF SYMPTOMS OF ANXIETY AND DEPRESSION IN ADULT PATIENTS WITH CANCER

GUIDELINE AT-A-GLANCE RECOMMENDED INTERVENTIONS

Anxiety

During Active Treatment

- Mindfulness-based interventions
- Yoga
- Hypnosis
- Relaxation therapy
- Music therapy or music-based interventions
- Reflexology
- Lavender essential oil inhalation

Post-Treatment

- Mindfulness-based interventions
- Yoga
- Acupuncture
- Tai chi and/or qigong
- Reflexology

Depression

During Active Treatment

- Mindfulness-based interventions
- Yoga
- Relaxation therapy
- Music therapy or music-based interventions
- Reflexology

Post-Treatment

- Mindfulness-based interventions
- Yoga
- Tai chi and/or qigong

Carlson et al *J Clin Oncol* **2023**
asco.org/survivorship-guidelines

Note. Evidence quality and strength of recommendations are available in the guideline publicatio

Activité physique et Pic de VO2

Bénéfices AP sur Pic VO2

Efficacy of Exercise Therapy on Cardiorespiratory Fitness in Patients With Cancer: A Systematic Review and Meta-Analysis

Jessica M. Scott, Emily C. Zabor, Emily Schwitzer, Graeme J. Koelwyn, Scott C. Adams, Tormod S. Nilsen, Chaya S. Moskowitz, Konstantina Matsoukas, Neil M. Iyengar, Chau T. Dang, and Lee W. Jones

J Clin Oncol.2018

- **48 Etudes Randomisées et Controlées**
- **3 632 patients**
- **Age moyen 55 ± 7,5 ans**
- **68 % de femmes**
- **1 990 (55 %) AP et 1 642 (45 %) UC**

Table 1. Trials Included in the Meta-Analysis (N = 48)

Variable	No. of Trials (%)
Publication year	
2000-2014	23 (48)
2015-2018	25 (52)
Region of origin	
Americas	19 (48)
United States	10
Canada	8
Brazil	1
Europe	22 (46)
Netherlands	5
United Kingdom	4
Denmark	3
Italy	2
Norway	2
Spain	2
France	1
Germany	1
Ireland	1
Asia	4 (8)
Iran	2
Korea	1
Taiwan	1
Australia	3 (6)
Sample size	
≤ 50	24 (50)
51-100	13 (27)
≥ 101	11 (23)
No. of participants	3,632 (100.0)
Group allocation	
Exercise	1,990 (55)
Control	1,642 (45)
Mean age, years (SD)	55 (7.5)
Female sex	2,336 (68)
Cancer site	
Breast	21 (44)
Prostate	6 (13)
Mixed	6 (13)
Lung	4 (8)
Other	4 (8)
Hematologic	3 (6)
Colorectal	2 (4)
GI	2 (4)
Setting	
Presurgery	5 (10)
During treatment	14 (29)
During and after primary adjuvant therapy	2 (4)
After primary adjuvant therapy, years	27 (56)
< 1	9 (19)
1 to 5	9 (19)
> 5	3 (6)
Time not reported	6 (13)

Abbreviation: SD, standard deviation.

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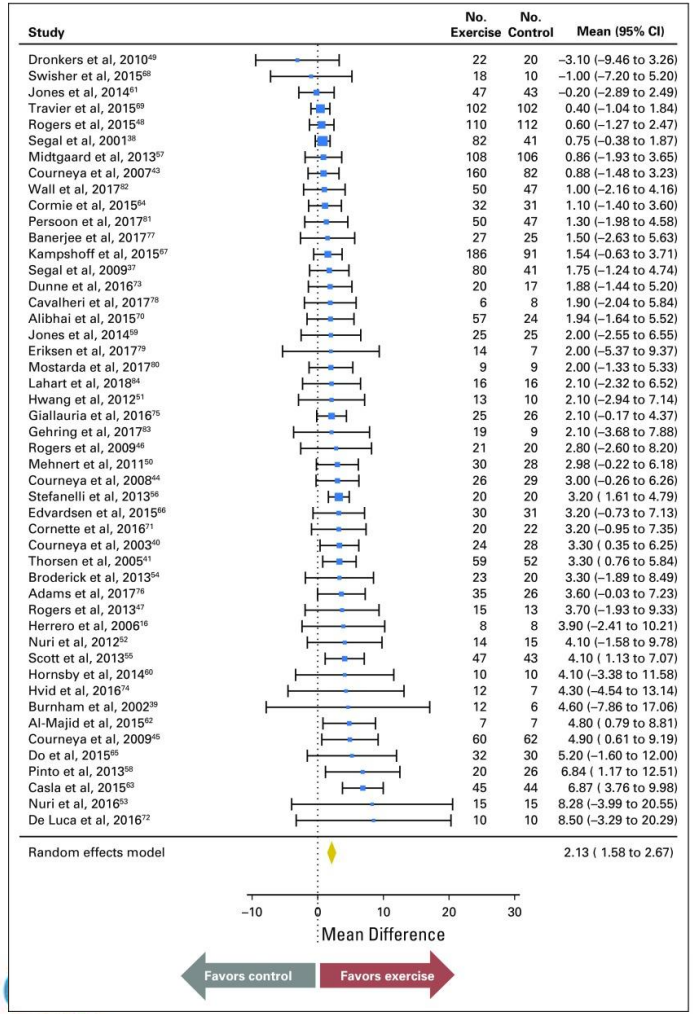
J Clin Oncol.2018

➔ **Gp AP: Augmentation significative de la Capacite cardio respiratoire (+2,80 mL $O_2 \times kg^{-1} \times min^{-1}$)** / rapp. à l'absence de changement (+0,02 mL $O_2 \times kg^{-1} \times min^{-1}$) dans le **groupe témoin, *P* < 0,001**).

- Trente essais (63 %) ont suivi les effets indésirables ; au total, 44 effets indésirables ont été signalés.



Mortalité cardio vasculaire / fonction capacité cardio-respiratoire (pic de VO2)

ESC European Society of Cardiology
European Heart Journal - Quality of Care and Clinical Outcomes (2020) 6, 315–322 ORIGINAL ARTICLE
doi:10.1093/ehjqcco/qcaa015

Association of post-diagnosis cardiorespiratory fitness with cause-specific mortality in cancer

John D. Groarke [1,2], David L. Payne[1], Brian Claggett[1], Mandeep R. Mehra[1], Jingyi Gong[1], Jesse Caron[1], Syed S. Mahmood[3], Jon Hainer[4], Tomas G. Neilan[5], Ann H. Partridge [2], Marcelo Di Carli[4], Lee W. Jones[3*,†], and Anju Nohria [1,2*,†]

[1]Division of Cardiovascular Medicine, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA; [2]Adult Survivorship Program, Department of Medical Oncology, Dana-Farber Cancer Institute, Brigham and Women's Hospital, 450 Brookline Avenue, Boston, MA 02215, USA; [3]Department of Medicine, Memorial Sloan Kettering Cancer Center, 1275 York Avenue, New York, NY 10065, USA; [4]Noninvasive Cardiovascular Imaging Program, Department of Radiology, Brigham and Women's Hospital, Boston, MA 02115, USA; and [5]Cardio-Oncology Program, Division of Cardiology, Department of Medicine, Massachusetts General Hospital, 55 Fruit Street, Boston, MA 02114-2696, USA

Received 11 September 2019; editorial decision 13 February 2020; accepted 10 March 2020; online publish-ahead-of-print 13 March 2020

Cancer type, *n* (%)					<0.001
Head and neck cancer	208 (13)	73 (13)	69 (13)	66 (12)	
Hodgkin lymphoma	253 (16)	35 (6)	63 (11)	155 (29)	
Breast cancer	436 (27)	169 (31)	148 (27)	119 (22)	
Prostate cancer	735 (45)	270 (49)	268 (49)	197 (37)	

1632 patients (58 % d'hommes ; 64 ± 12 ans)
Cancer apparu à l'âge adulte
Test d'exercice sur tapis roulant une médiane de 7 ans après le diagnostic initial
Suivi médian 4,6 ans

Mortalité cardio vasculaire / fonction capacité cardio-respiratoire (pic de VO2)

411 décès (229, 50 et 132 toutes causes confondues, cardiovasculaires (CV) et liés au cancer, respectivement) sont survenus pendant cette période.

Le risque ajusté de mortalité toutes causes confondues, CV et par cancer a diminué respectivement de 26 %, 14 % et 25 % à chaque augmentation d'un MET dans le CRF.

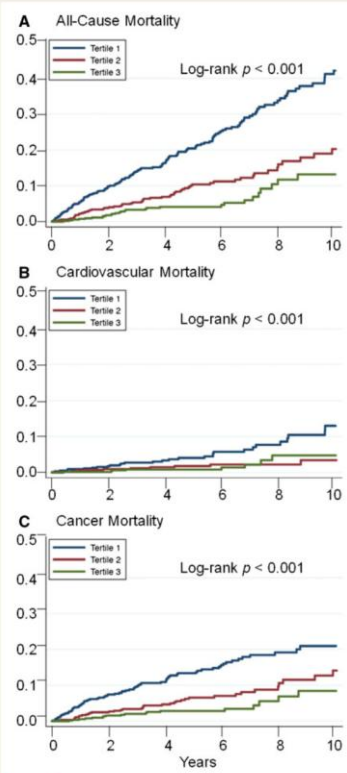


Figure 2 Probability of all-cause mortality (*A*), cardiovascular mortality (*B*), and cancer mortality (*C*) in cancer patients according to cardiorespiratory fitness tertiles achieved during exercise treadmill testing: low cardiorespiratory fitness (blue line), intermediate cardiorespiratory fitness (red line), and high cardiorespiratory fitness (green line).

Probability of all-cause mortality (*A*), cardiovascular mortality (*B*), and cancer mortality (*C*) in cancer patients according to cardiorespiratory fitness tertiles achieved during exercise treadmill testing:

- **low cardiorespiratory fitness (blue line)**
- **intermediate cardiorespiratory fitness (red line)**
- **high cardiorespiratory fitness (green line)**

Association of post-diagnosis cardiorespiratory fitness with cause-specific mortality in cancer. Groarke JD and al. European Heart Journal - Quality of Care and Clinical Outcomes, 2020

Mortalité cardio vasculaire / fonction capacité cardio-respiratoire (pic de VO2)

Une augmentation d'un MET de FCR était associée à une **réduction relative de 14 % (IC à 95 % : 0,76–0,97) et de 25 % (IC à 95 % : 0,69–0,80) du risque de décès par CV et par cancer,** respectivement

Table 3 **Risk of all-cause, cardiovascular, and cancer death for every one metabolic equivalent increase in cardiorespiratory fitness**

	Age-adjusted hazard ratio per MET increase in exercise capacity (95% CI)	Adjusted[a] hazard ratio per MET increase in exercise capacity (95% CI)
All-cause death	0.79 (0.75–0.83)	0.74 (0.70–0.79)
Cardiovascular death[b]	0.86 (0.76–0.98)	0.86 (0.76–0.97)
Cancer death[b]	0.80 (0.74–0.85)	0.75 (0.69–0.80)

[a]Adjusted for age, gender, race, body mass index, Morise risk score, AV nodal blockers, interval from cancer diagnosis to exercise treadmill test, and result of exercise treadmill test.
[b]Risk of cardiovascular and cancer death was calculated using a competing risk model.

Association of post-diagnosis cardiorespiratory fitness with cause-specific mortality in cancer. Groarke JD and al. European Heart Journal - Quality of Care and Clinical Outcomes, 2020

Activité physique et survie

Activité physique et survie

. **Réduction de 20 à 50 %** la mortalité globale, spécifique et le risque de récidive dans les **cancers sein, colorectal et de la prostate**, relation dose-dépendante

. **Reduction de 40% de la mortalité** toutes causes, chez les survivants d'un cancer pédiatrique ou AJA surtout en cas d'augmentation progressive du niveau d'activité

McTiernan A, Friedenreich CM, Katzmarzyk PT, Powell KE, Macko R, et al. *Physical activity in cancer prevention and survival: a systematic review.* Med Sci Sports Exerc. 2019;51(6):1252–61. doi:10.1249/MSS.0000000000001937. Kenfield SA, Stampfer MJ, Giovannucci E, Chan JM. Physical activity and survival after prostate cancer diagnosis in the Health Professionals Follow-Up Study. J Clin Oncol. 2011;29(6):726-732.
Scott JM, Li N, Liu Q, Yasui Y, Leisenring W, Nathan PC, Gibson T, Armenian SH, Nilsen TS, Oeffinger KC, Ness KK, Adams SC, Robison LL, Armstrong GT, Jones LW. Association of exercise with mortality in adult survivors of childhood cancer. JAMA Oncol. 2018 Oct 1;4(10):1352–1358. doi:10.1001/jamaoncol.2018.2254.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Structured Exercise after Adjuvant Chemotherapy for Colon Cancer

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DOI: 10.1056/NEJMoa2502760

Méthodologie

- 889 patients ayant subi une résection pour cancer du côlon stade III et ayant terminé leur chimiothérapie adjuvante.
- **Randomisation** : 445 patients dans le groupe exercice, 444 dans le groupe éducation sanitaire.
- **Programme d'exercice** : Durée de 3 ans, avec un objectif d'augmenter l'activité physique récréative d'au moins 10 MET-h/ semaine
- **Critères d'évaluation** :
  - Critère principal : Survie sans maladie
  - Critères secondaires : Survie globale, QDV score physique auto-évaluée (SF-36), et aptitude physique liée

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Exercise Group (N=445)	Health-Education Group (N=444)	All Patients (N=889)
Age			
Median (range) — yr	61 (26–84)	61 (19–83)	61 (19–84)
≥65 yr — no. (%)	150 (33.7)	155 (34.9)	305 (34.3)
Female sex — no. (%)	233 (52.4)	224 (50.5)	457 (51.4)
Geographic region — no. (%)			
Canada	270 (60.7)	273 (61.5)	543 (61.1)
Australia	146 (32.8)	146 (32.9)	292 (32.8)
Other†	29 (6.5)	25 (5.6)	54 (6.1)
Median weight (IQR) — kg	80.7 (69.1–95.6)	81.9 (70.0–96.7)	81.2 (69.5–96.2)
Median body-mass index (IQR)‡	28.5 (25.4–32.6)	28.6 (25.3–32.4)	28.5 (25.4–32.5)
Obesity — no. (%)	169 (38.0)	167 (37.6)	336 (37.8)
ECOG performance-status score — no. (%)§			
0	323 (72.6)	324 (73.0)	647 (72.8)
1	122 (27.4)	120 (27.0)	242 (27.2)
Smoking status — no. (%)			
Current	26 (5.8)	16 (3.6)	42 (4.7)
Ever smoked	206 (46.3)	211 (47.5)	417 (46.9)
Major medical problem — no. (%)	263 (59.1)	258 (58.1)	521 (58.6)
Hypertension	103 (23.1)	114 (25.7)	217 (24.4)
High cholesterol level¶	57 (12.8)	74 (16.7)	131 (14.7)
Diabetes or hyperglycemia	47 (10.6)	52 (11.7)	99 (11.1)
Cardiac history	36 (8.1)	42 (9.5)	78 (8.8)
Depression or anxiety	36 (8.1)	37 (8.3)	73 (8.2)
Disease stage — no. (%)			
High-risk stage II adenocarcinoma	43 (9.7)	44 (9.9)	87 (9.8)
Stage III adenocarcinoma	402 (90.3)	400 (90.1)	802 (90.2)
Clinical tumor stage — no. (%)			
T1	26 (5.8)	28 (6.3)	54 (6.1)
T2	42 (9.4)	54 (12.2)	96 (10.8)
T3	273 (61.3)	246 (55.4)	519 (58.4)
T4	104 (23.4)	116 (26.1)	220 (24.7)
Chemotherapy regimen — no. (%)			
FOLFOX	267 (60.0)	275 (61.9)	542 (61.0)
CAPOX	58 (13.0)	71 (16.0)	129 (14.5)
Capecitabine	76 (17.1)	74 (16.7)	150 (16.9)
Other	44 (9.9)	24 (5.4)	68 (7.6)
Treatment history			
Median interval from diagnosis to trial randomization (IQR) — yr	0.9 (0.8–1.1)	1.0 (0.9–1.1)	1.0 (0.8–1.1)
Median interval from chemotherapy to trial randomization (IQR) — mo	3.9 (3.1–5.3)	3.9 (3.1–5.2)	3.9 (3.1–5.3)

• **Durée** : 3 ans de suivi après la chimiothérapie adjuvante.
•**Objectif principal** : Évaluer la survie sans maladie (disease-free survival).

Résultats

•**Survie sans maladie** :
- Groupe exercice : 80,3% à 5 ans.
- Groupe éducation santé : 73,9% à 5 ans.
- Réduction du risque relatif : 28% (hazard ratio = 0,72).

•**Survie globale** :
- Groupe exercice : 90,3% à 8 ans.
- Groupe éducation santé : 83,2% à 8 ans.
- Réduction du risque de décès : 37% (hazard ratio = 0,63).

•**Amélioration de la fonction physique** :
- Groupe exercice : Amélioration significative QDV Score physique (échelle SF-36) maintenue sur 24 mois.

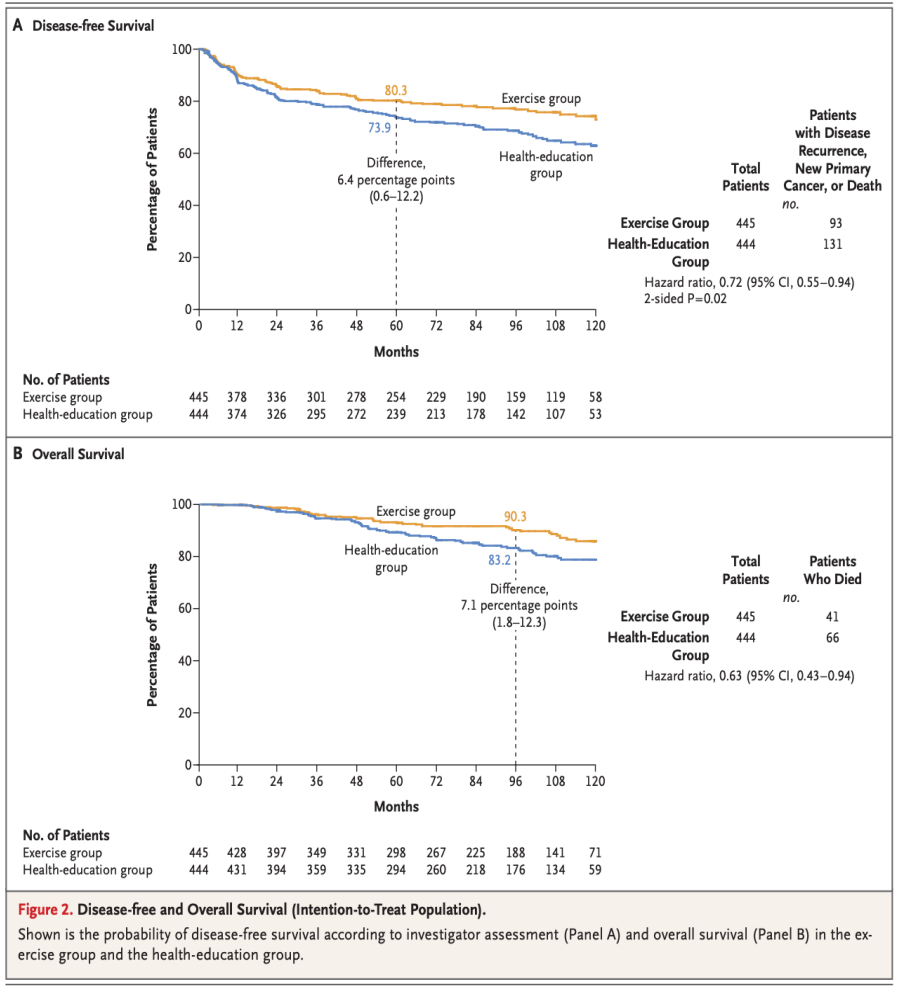


Figure 2. Disease-free and Overall Survival (Intention-to-Treat Population).
Shown is the probability of disease-free survival according to investigator assessment (Panel A) and overall survival (Panel B) in the exercise group and the health-education group.

DOI: 10.1056/NEJMoa2502760

Activité physique et fatigue dite cancéro-induite

Epidémiologie: Préoccupations sociales, physiques et émotionnelles

Journal of Clinical Medicine

MDPI

Article

The Needs and Experiences of Post-Treatment Adolescent and Young Adult Cancer Survivors

Jennifer M Jones [1,*], Margaret Fitch [2], Jared Bongard [1], Manjula Maganti [3], Abha Gupta [4,5], Norma D'Agostino [6] and Chana Korenblum [6,7]

J. Clin. Med. 2020, 9, 1444;

Enquête nationale Canadienne
évalue les expériences et les besoins physiques et psychosociaux non satisfaits
des survivants du cancer (≥ 18 ans)
au cours des 5 premières années suivant le traitement du cancer

Table 1. *Cont.*

Characteristic	*N*	%
Time since treatment		
< 1 year	63	11.0
1 year to < 3 years	299	52.0
3 years to 5 years	170	29.6
No treatment received	38	6.6
Missing	6	1.0
Type of Treatment		
Surgery only	172	29.9
Drug therapy only (chemo/non-chemo)	86	15.0
Radiation therapy only	11	1.9
Combination of therapies	290	50.4
No treatment/active surveillance	10	1.7
Missing	6	1.0
Comorbidities (4 Most Common)		
Mental Health Issues	71	11.5
Respiratory Diseases	43	6.9
Cardiovascular	11	1.8
Arthritis/Osteoarthritis	8	1.3
General Physical Health		
Very poor/poor	19	3.3
Fair	115	20.0
Good/Very good	440	76.5
Missing	1	0.2
General Emotional Health		
Very poor/poor	24	4.2
Fair	142	24.7
Good/Very good	402	69.9
Missing	7	1.2
Overall quality of life		
Very poor/poor	13	2.3
Fair	63	11.0
Good/Very good	499	86.8
Missing	0	0

- **Concerne une population post-traitement** d'AJA de 18 à 34 ans
- Femmes (61%)
- Personnes mariées ou concubinage (51%).

Table 2. Physical symptoms prevalent and ease of accessing help in AYA sample.

88 %

Physical Symptoms	Number of Respondents Who Answered the Question	Number of Respondents Indicating a Concern about a Physical Symptom (Mild, Moderate, or Big)	Number of Respondents Experiencing a Physical Symptom Whose Concern was 'Big'	Number of Respondents Experiencing a Physical Symptom Whose Concern was 'Moderate'	Number of those Experiencing a Physical Symptom Who Sought Help *	Number of those who Sought Help for their Concern that Experience Some Level of Difficulty (Hard or very Hard to Find Help/no Help Obtained) *
Fatigue or tiredness	566	444 (78%) (78 %)	192 (43%)	141 (32%)	207 (47%) *N* = 441	73 (35%) *N* = 207
Hormonal, menopause, or fertility	561	280 (50%)	141 (50%)	74 (26%)	184 (66%) *N* = 279	55 (30%) *N* = 184
Changes to concentration, memory	560	274 (49%)	98 (36%)	89 (32%)	112 (41%) *N* = 274	52 (47%) *N* = 111
Nerve problems (numbness or tingling)	562	244 (43%)	55 (23%)	80 (33%)	146 (60%) *N* = 243	44 (30%) *N* = 146
Changes in sexual activity or function	561	229 (41%)	80 (35%)	68 (30%)	86 (38%) *N* = 229	34 (40%) *N* = 86
Chronic pain or long-term pain	561	209 (37%)	52 (25%)	75 (36%)	137 (66%) *N* = 209	51 (38%) *N* = 136
Gastrointestinal problems (i.e., digestion and/or bowl issues)	559	180 (32%)	55 (31%)	57 (32%)	115 (64%) *N* = 180	25 (22%) *N* = 115
Swelling of arms or legs	560	106 (19%)	28 (26%)	29 (27%)	61 (58%) *N* = 105	17 (28%) *N* = 61
Bladder and/or urinary problems (e.g., incontinence)	560	58 (10%)	15 (26%)	19 (33%)	37 (64%) *N* = 58	13 (35%) *N* = 37

* Note: Those who did not answer relevant questions were excluded from the data set. *N* refers to the denominator used for a concern.

Nécessité d'approches proactives pour identifier et éliminer les barrières à l'accès aux soins appropriés pour ➔ qualité de vie

Table 3. Emotional concerns prevalent and ease of accessing help in AYA sample.

90 % Emotional Concerns	Number of Respondents Who Answered the Question	Number of Respondents Indicating a Concern about an Emotional Issue (Mild, Moderate, or Big)	Number of Respondents Experiencing an Emotional Issue Whose Concern was 'Big'	Number of Respondents Experiencing an Emotional Issue whose Concern was 'Moderate'	Number of those Experiencing an Emotional Issue Who Sought Help *	Number of those Who Sought Help for their Concern that Experience some Level of Difficulty (Hard or very Hard to Find Help/no Help Obtained) *
Anxiety, stress, or worry about the cancer returning	560	83 % 468 (84%)	185 (40%)	150 (32%)	181 (40%) *N* = 465	54 (30%) *N* = 181
Changes in body image (i.e. confidence in appearance)	568	365 (64%)	136 (37%)	119 (33%)	90 (25%) *N* = 359	28 (31%) *N* = 90
Depression, sadness, and loss of interest in everyday things	547	360 (66%)	119 (33%)	121 (34%)	154 (43%) *N* = 355	53 (35%) *N* = 153
Changes in relationship with family, partners	566	274 (48%)	82 (30%)	94 (34%)	80 (30%) *N* = 271	30 (38%) *N* = 78
Changes in sexual intimacy	563	254 (45%)	84 (33%)	83 (33%)	64 (25%) *N* = 251	29 (46%) *N* = 63
Changes in relationships with friends or coworkers	567	226 (40%)	43 (19%)	82 (36%)	43 (19%) *N* = 224	18 (42%) *N* = 43

* Note: Those who did not answer relevant questions were excluded from the data set. *N* refers to the denominator used for a concern.

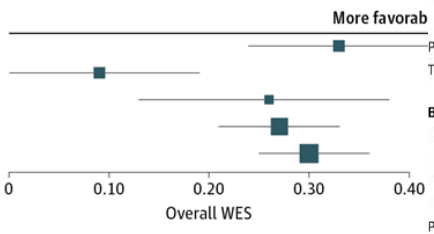
Table 4. Practical concerns prevalent and ease of accessing help in AYA sample.

79 % Practical Concerns	Number of Respondents Who Answered the Question	Number of Respondents Indicating a Concern about a Practical Challenge (Mild, Moderate, or Big)	Number of Respondents Experiencing a Practical Challenge Whose Concern was 'Big'	Number of Respondents Experiencing a Practical Challenge Whose Concern was 'Moderate'	Number of those Experiencing a Practical Challenge Who Sought Help *	Number of those Who Sought Help for their Concern that Experienced Some Level of Difficulty (Hard or very Hard to find Help/no Help Obtained) *
Returning to work or school now or in the future	564	351 (62%)	169 (48%)	104 (30%)	136 (39%) *N* = 350	53 (39%) *N* = 136
Difficulty getting health or life insurance	562	229 (41%)	89 (39%)	71 (31%)	65 (29%) *N* = 227	41 (63%) *N* = 65
Getting to and from appointments	563	207 (37%)	33 (16%)	74 (36%)	69 (34%) *N* = 205	13 (19%) *N* = 69
Paying health care bills (e.g., treatment, services, transportation to appointments)	564	180 (32%)	61 (34%)	55 (31%)	76 (43%) *N* = 177	40 (53%) *N* = 75
Taking care of children, elders, or other family members	561	114 (20%)	36 (32%)	28 (25%)	35 (32%) *N* = 109	16 (46%) *N* = 35

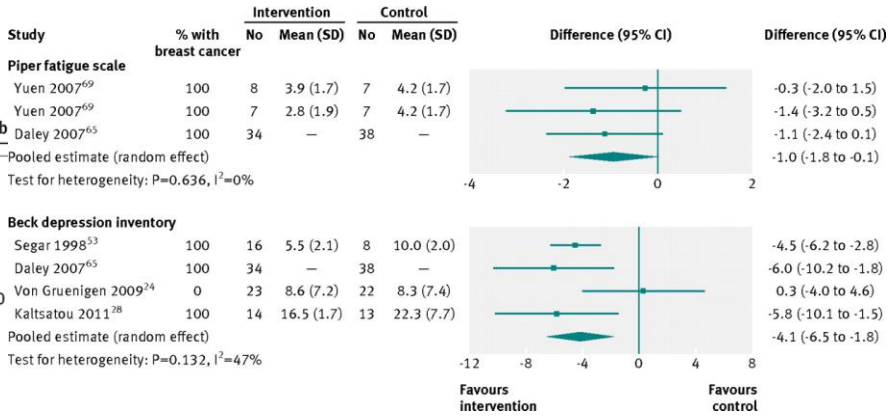
* Note: Those who did not answer relevant questions were excluded from the data set. N refers to the denominator used for a concern.

Physical activity and cancer related-fatigue/depression

Intervention	No. of Effect Sizes	WES	SE	(95% CI)
All	127	0.33	0.05	(0.24-0.43)
Pharmaceutical	14	0.09	0.05	(0.00-0.19)
Exercise plus psychological	10	0.26	0.07	(0.13-0.38)
Psychological	34	0.27	0.05	(0.21-0.33)
Exercise	69	0.30	0.03	(0.25-0.36)



Mustian KM and al. JAMA Oncol 2017



Association between physical activity and fatigue and depression in patients with cancer

Fong DY and al. BMJ 2012

PA and cancer related fatigue

20 ERC

1793 cancer sein

Pdt. Chimiothérapie et radiothérapie

AP **réduit significativement la fatigue** liée au cancer (SMD = −0,46 ; intervalle de confiance à 95 % : −0,66 à −0,27) > sédentaire sans AP

Exercice combiné AT + RT supervisé > separé : (SMD = −1,13 ; IC à 95 % : −2,09 à −0,17)

Ent. Résistance supervisée seul + efficace Ex. aérobique supervisé ou les techniques corps-esprit (yoga ou le tai-chi) (SMD = −0,30 ; IC à 95 % : −0,46 à −0,15)

Effet bénéfique significatif surtout pendant la chimiothérapie (SMD = −0,38 ; IC à 95 % : −0,55 à −0,20)

Table 3 Post-intervention data, number of participants (*n*), mean and standard deviation (SD) for fatigue in different types of physical exercises, and standardized mean difference (SMD) with CI 95% using the random effects model with associated levels of heterogeneity (I^2)

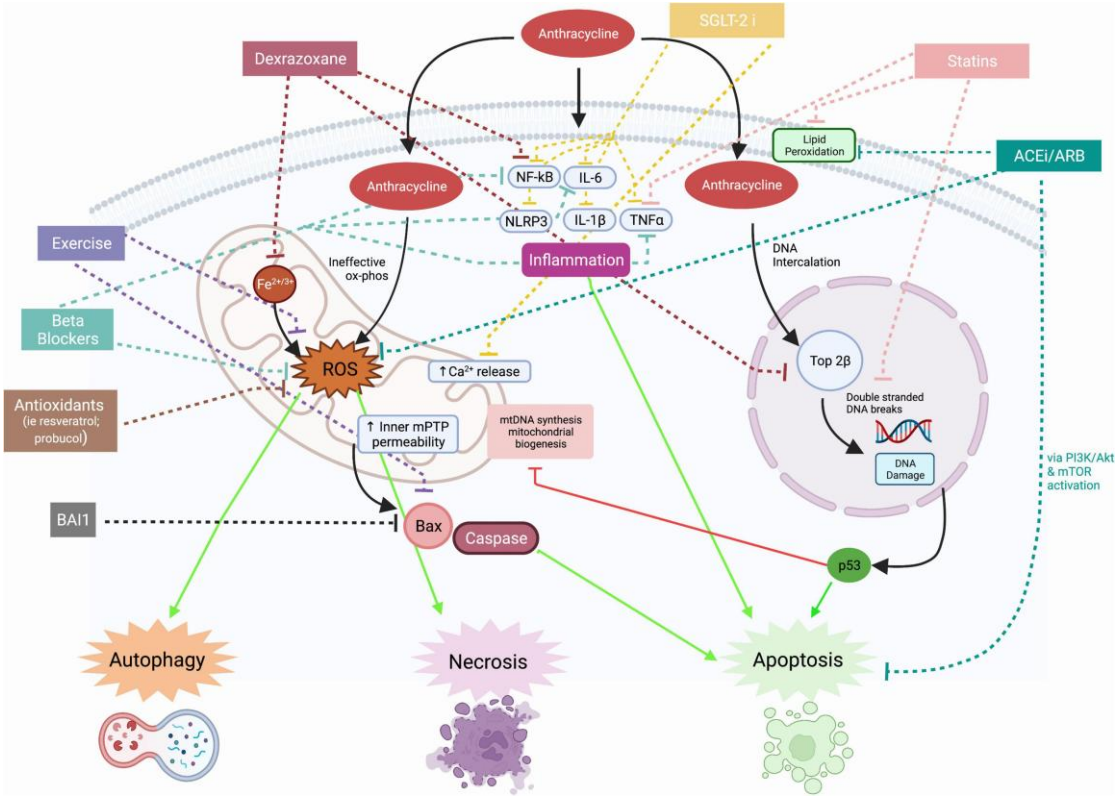
Study and year	Intervention		Control		SMD (95% CI)	% weight
	N	Mean (SD)	*N*	Mean (SD)		
Supervised RT exercises						
Courneya et al. 2007	76	−36.3 (9.4)	73	−34.9 (12.5)	−0.13 (−0.45, 0.19)	23.85
Schmidt et al. 2014	49	36.1 (20.6)	46	44.8 (21.0)	−0.42 (−0.83, −0.01)	14.90
Steindorf et al. 2014	77	5.4 (2.3)	78	5.9 (1.9)	−0.24 (−0.55, 0.08)	24.69
Schmidt et al. 2015	21	10.55 (3.22)	26	12.38 (3.50)	−0.54 (−1.13, 0.04)	7.18
Mijwel et al. 2018	74	3.16 (2.92)	60	3.94 (2.95)	−0.27 (−0.61, 0.08)	21.08
Cešeiko et al. 2019	27	25.5 (15.5)	28	36.8 (16.7)	−0.70 (−1.25, −0.16)	8.29
Total (95% CI)	324		311		**−0.30 (−0.46, −0.15)**	100.0
Heterogeneity		$Chi^2 = 4.36$	*df* = 5 (*p* = 0.499)		$I^2 = 0.0\%$	
Global effect test	*Z* = 3.80	*p* = 0.000				
Supervised AT exercises						
Courneya et al. 2007	74	−36.8 (10.4)	73	−34.9 (12.5)	−0.17 (−0.50, 0.16)	42.20
Moros et al. 2010	10	31.1 (24.4)	7	30.1 (18.9)	0.04 (−0.92, 1.01)	4.74
Al Majid et al. 2015	6	3.0 (1.96)	6	4.6 (2.20)	−0.77 (−1.95, 0.41)	3.18
Schmidt et al. 2015	20	12.35 (4.37)	26	12.38 (3.50)	−0.01 (−0.59, 0.58)	13.03
Mijwel et al. 2018	70	3.16 (2.61)	60	3.94 (2.95)	−0.28 (−0.63, 0.07)	36.86
Total (95% CI)	180		172		−0.20 (−0.41, 0.01)	100.0
Heterogeneity		$Chi^2 = 1.81$	df = 4 (*p* = 0.771)		$I^2 = 0.0\%$	
Global effect test	*Z* = 1.83	*p* = 0.067				
Supervised RT + AT exercises						
Campbell et al. 2005	10	2.43 (1.94)	9	4.35 (3.48)	−0.69 (−1.62, 0.24)	22.48
Travier et al. 2015	91	11.82 (4.23)	82	12.74 (3.69)	−0.23 (−0.53, 0.07)	27.73
Van Waart et al. 2015	71	13.1 (3.9)	66	14.7 (4.2)	−0.40 (−0.73, −0.06)	27.53
Waked et al. 2016	23	3.91 (1.64)	23	8.7 (0.9)	−3.62 (−4.57, −2.67)	22.26
Total (95% CI)	195		180		**−1.13 (−2.09, −0.17)**	100.0
Heterogeneity	$Tau^2 = 0.841$	$Chi^2 = 44.91$	*df* = 3 (*p* = 0.000)		$I^2 = 93.3\%$	
Global effect test	*Z* = 2.32	*p* = 0.021				
Supervised MB exercises						
Vadiraja et al. 2009	42	31.37 (21.79)	33	52.09 (24.24)	−0.90 (−1.38, −0.43)	33.46
Chen et al. 2014	49	3.1 (2.0)	47	2.7 (2.1)	0.20 (−0.21, 0.60)	34.20
Taso et al. 2014	30	10.9 (6.9)	30	20.4 (5.0)	−1.58 (−2.16, −0.99)	32.34
Total (95% CI)	121		110		−0.75 (−1.78, 0.28)	100.0
Heterogeneity	$Tau^2 = 0.765$	$Chi^2 = 27.33$	df = 2 (*p* = 0.000)		$I^2 = 92.7\%$	
Global effect test	*Z* = 1.42	*p* = 0.155				
Unsupervised AT exercises						
Mock et al. 2005	54	3.5 (2.4)	54	3.7 (2.6)	−0.08 (−0.46, 0.30)	24.21
Reis et al. 2013	12	−45.2 (5.32)	17	−42.3 (7.84)	−0.42 (−1.17, 0.33)	15.82
Naraphong et al. 2015	9	3.62 (2.07)	12	3.38 (2.75)	0.10 (−0.77, 0.96)	13.67
Van Waart et al. 2015	69	13.7 (3.9)	66	14.7 (4.2)	−0.25 (−0.59, 0.09)	25.09
Wang et al. 2011	35	−45.81 (4.29)	37	−39.91 (5.38)	−1.21 (1.71, −0.70)	21.20
Total (95% CI)	179		186		−0.40 (−0.83, 0.05)	100.0
Heterogeneity	$Tau^2 = 0.167$	$Chi^2 = 14.55$	*df* = 4 (*p* = 0.006)		$I^2 = 72.5\%$	
Global effect test	*Z* = 1.76	*p* = 0.079				
Unsupervised RT + AT exercises						
Husebo et al. 2014	29	12.01 (4.38)	31	13.13 (4.47)	−0.25 (−0.76, 0.26)	
Total (95% CI)	29		31		−0.25 (0.76, 0.26)	

RT, resistance training; *AT*, aerobic training; *MB*, mind–body exercises; *RT+AT*, combined resistance and aerobic training

Torres D, Supportive care in cancer 2022

Activité physique et MCV

Anthracyclines: myocardial effects



Vuong J and Al. Frontiers in cardiovascular medicine, 2022

Murine Study : AP before-chemotherapy

40 adult male rats, trained 60/90 minutes per day, 5 days/week, 14 weeks

Table 6. Effects of endurance running training and DOX on heart antioxidant enzyme activity:

Groups	tSOD	MnSOD	Cu/ZnSOD	GPx	GR
NT + P	94.88±2.64	46.07±1.27	49.80±1.96	1.14±0.23	$1.13\times10^{-4}\pm2.84$
NT + DOX	87.17±5.03	43.25±4.69	43.91±3.55	1.85±0.42	$1.17\times10^{-4}\pm4.54\times10^{-5}$
T + P	139.95±7.58*	74.05±5.46*	65.90±4.36*	2.10±0.47	$2.26\times10^{-4}\pm7.27\times10^{-5}$
T + DOX	129.23±2.96*	70.13±2.99*	59.09±2.62*	1.58±0.51	$1.30\times10^{-4}\pm4.97\times10^{-5}$

Cardiac mitochondrial antioxidant enzymes

Ascansao A. and al, Am J Physiol Heart Circ Physiol. 2005.

Murine Study : AP before-chemotherapy

Mitochondria more sensitive to apoptosis under DOX Via Protein Bax

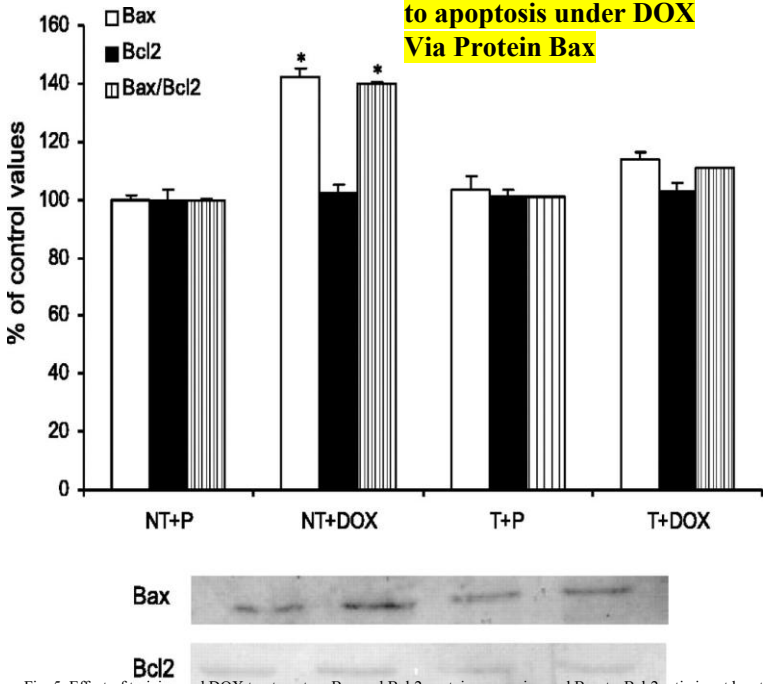


Fig. 5. Effect of training and DOX treatment on Bax and Bcl-2 protein expression and Bax-to-Bcl-2 ratio in rat heart mitochondria. Representative Western blots of Bax (21 kDa) and Bcl-2 (25 kDa) are shown for each group. Values are means ± SE of results obtained from 10 independent experiments. *$P < 0.05$ vs. all other groups.

Activation of the apoptotic pathway by caspases 3 under treatment by DOX, Inhibition by endurance training

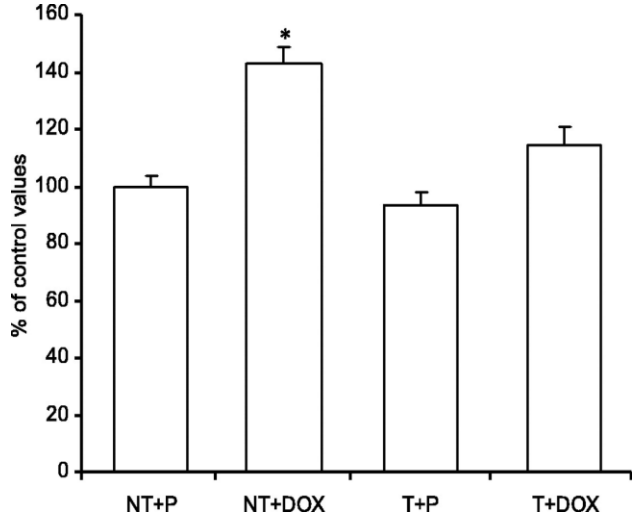


Fig. 6. Effect of training and DOX treatment on cardiac muscle homogenate caspase-3 activity. Values are means ± SE of results obtained from 10 independent experiments. *$P < 0.05$ vs. all other groups.

Ascansao A. and al, Am J Physiol Heart Circ Physiol. 2005.

Murine Study : AP before-chemotherapy

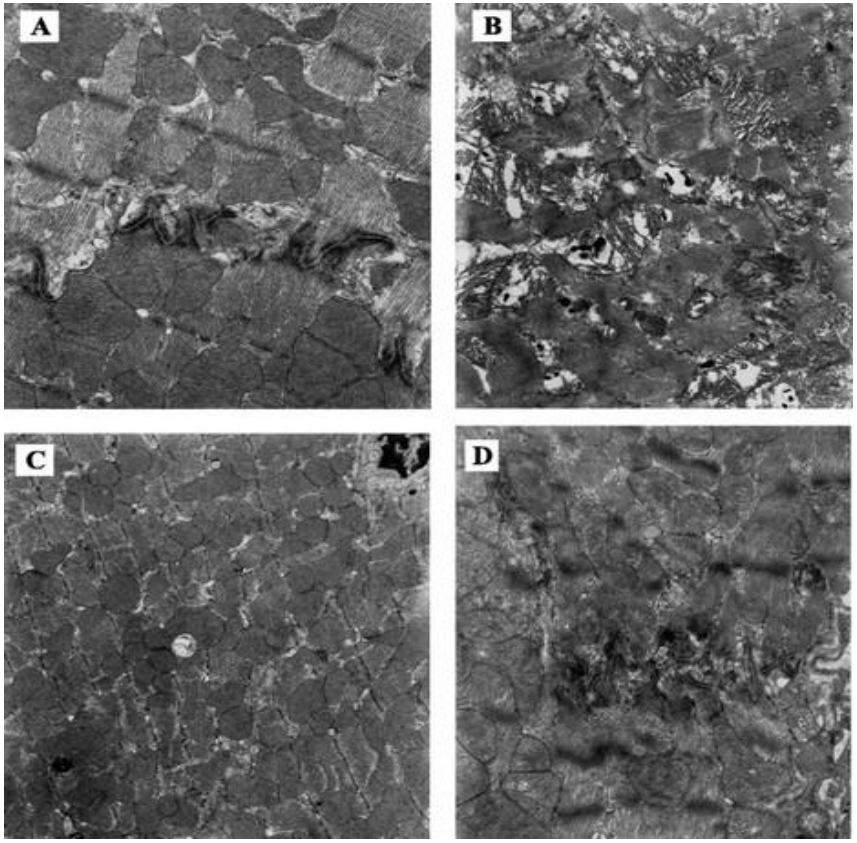


Fig. 7.Representative electron micrographs of cardiac tissue from NT + P (A), NT + DOX (B), T + P (C), and T + DOX (D) groups.

NT + DOX group (B)
T + DOX group (D).

- ***Cytoplasmic vacuoles***
- ***Myofibrillar disorganization***
- ***Severe mitochondrial damage***
- ***Extensive degeneration***

Ascansao A. and al, Am J Physiol Heart Circ Physiol. 2005.

Murine Study : AP before-chemotherapy

- AP endurance pre-DOX:

➢ Cardiac mitochondrial protection

➢ DOX-mediated reduction of mitochondrial oxydative stress

➢ DOX-mediated reduction of apoptosis pathway

Ascansao A. and al, Am J Physiol Heart Circ Physiol. 2005.

Murine Study: Pre/per/post-chemotherapy

Systematic review + meta-analysis of preclinical studies :14 publications from 2008 to 2021

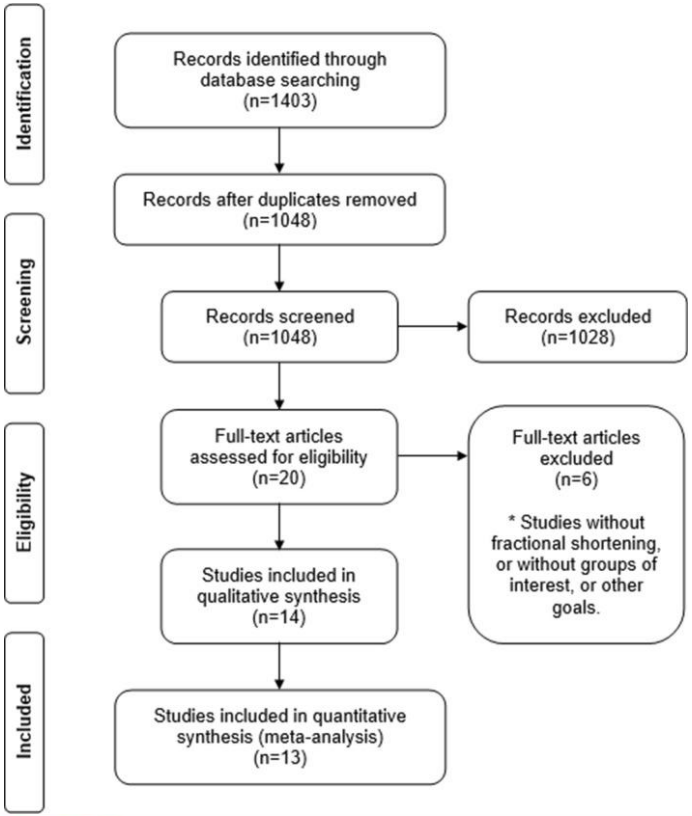
923 rodents

To evaluate the efficacy of physical training on DOX-induced cardiomyopathy

Inclusion of studies with animal models of DOX-induced cardiomyopathy + exercise

PubMed, Web of Sciences and Scopus databases

To search for the mean difference in RF assessed by echocardiography between sedentary and trained animals treated with DOX



Da Costa Ghignatti PV et al. Nature, scientific report, 2011

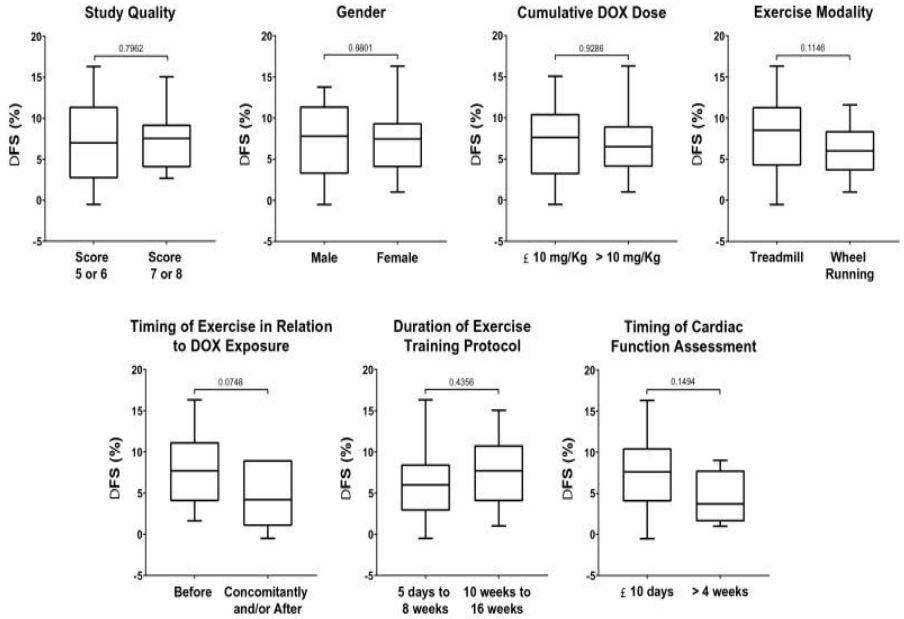
Murine Study: Pre/per/post-chemotherapy

Physical exercise is cardioprotective in DOX-treated rats with HF, especially if proposed and performed before Treatment.

Significant increase of 7.40% FR in IC rats under DOX, p<0.001 FR / sedentary rats.

Better results in rats trained before DOX inj ° / pdt or after

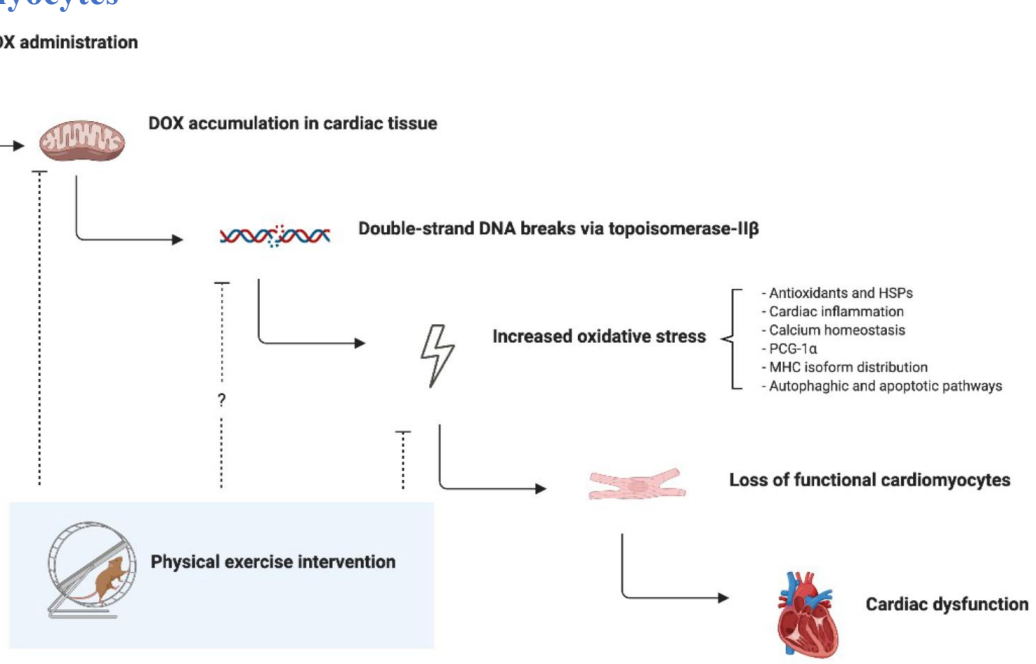
No difference between exercise modalities, duration, gender, cumulative DOX dose



Da Costa Ghignatti PV et al. Nature, scientific report, 2011

Pre-clinical and clinical study

Cardioprotection: Better FR and less accumulation of DOX in cardiomyocytes



Naaktgeboren WR J Am Heart Assoc. 2021

Physical exercise = Potential non-pharmacological strategy to protect or even reverse anthracycline-induced cardiac damage

Werner C and al. J Am Coll Cardiol. (2008) 52:470–82.	**Improvement of myocardial tissue renewal**	**Apoptosis regulation**
Marques-Aleixo I and al. Cardiovasc Toxicol. (2018)		**Apoptosis regulation**
Lee Y and al. Med Sci Sports Exerc. (2020)		**Apoptosis regulation**
Vujic A and al. Nat Commun. (2018)		**Increases formation of cardiomyocyte progenitor cells**
Smuder AJ and al. J Appl Physiol. (2013)		**Autophagy module and lysosomal signaling**
French JP and al. The FASEB Journal. (2008)		**Normalizes myocardial calcium activity**
Lien C-Y, J Physiol Biochem. (2015)	**Exercise frequencies and intensities that would not be achievable in humans**	

Clinical Study: Pre/Per-chemotherapy

Kirkham AA and al. *Breast Cancer Res Treat.* (2018)	RCT	Acute changes in cardiac function	Breast cancer (Stage IIB-IIIC)	Pre-treatment ***(Walk 30 min, 24 h before inj° DOX)*** ***Only one exercice***	Intervention (*N* =13); Usual care: *N* = 11	Acute bout aerobic exercise 70% age-predicted HRR	N/A	**NT-pro-BNP$^{B, WI}$** **Ejection fraction^{WI}** **Systolic strain rate^{WI}** **But desapeared 15 days after interventon.**
Hornsby WE and al. *Acta Oncol.* (2014)	RCT	Adverse events; cardiopulmonary function, patient-reported outcomes	Breast cancer (Stage IIB-IIIC)	**On-treatment Neoadjuvant chemotherapy** (4 cycles): 60 mg/m^2 DOX and 600 mg/m^{2}cyclophosphamide	Intervention (*N* =10); Usual care (*N* = 10)	12 weeks 3x/week Supervised 15–45 min sessions (progressive design) 60–100% VO_{2peak}	Attendance rate was 82%, adherence to protocol was 66%.	Resting HR^{WC} **Peak exercise** HR^{WC} Oxygen pulse$^{B, WI, WC}$ VOB,WI,WC2 peak **No difference EF**

PA and LVEF /GLS/VO2 Peak

- 8 Studies published between 2009 et 2019, Breast cancer
- **Anthracyclines** 87,5% of studies
- **Anthracyclines + trastuzumab** 12,5% of studies

- **AP Group: Average of 12.7 ± 6.9 (9–31) women 48.6 ± 3.7 Years old**
- **Control Group: Average 10.8 ± 8.5 (8–33) women 50.1 ± 4.7 Years old**

- In average **10.1 ± 4.4 (1–16) weeks of PA**
- **28.4 ± 16.5 (1–48) sessions**
- **43.4 ± 13.7 (15–60) min / session**
- Intensity determined by VO2 peak research, MHR, FC reserve

- **50% of studies: aerobic exercise continuous**
- **37.5% of studies: continuous aerobic exercise, IT, resistance work**
- **12.5% of studies: IT**

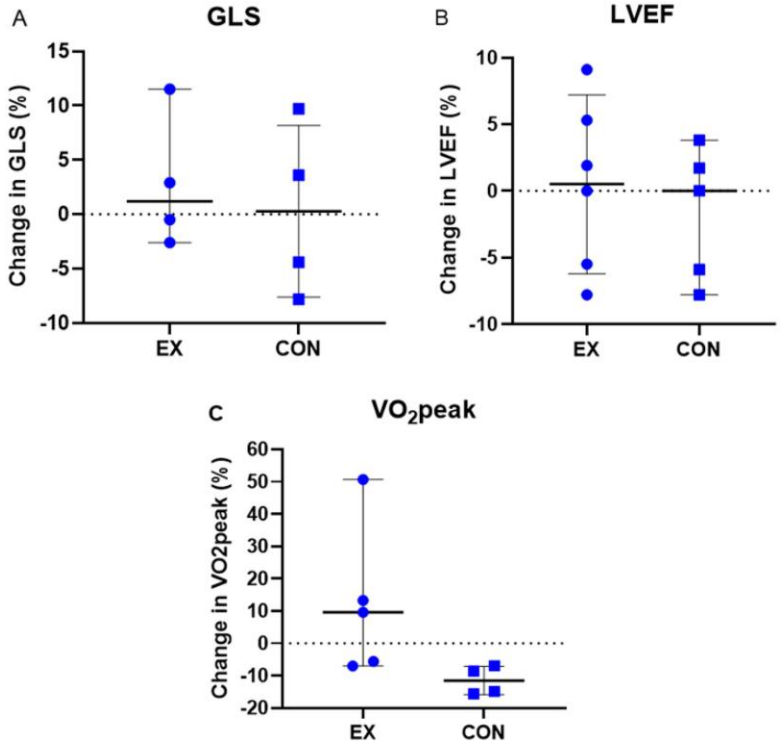


Figure 2 Relative change (from baseline) in GLS (A), LVEF (B) and VO2 peak (C) in studies reporting pre- and post-outcomes for either EX or CON groups.

Murray J. and al. European Journal of Preventive Cardiology 2022

Breast cancer, ATC, Anti HER2 +: EMBRACE MRI 1(during and after treatment)

Evaluation of Myocardial Changes During Breast Adenocarcinoma Therapy to Detect Cardiotoxicity Earlier With MRI

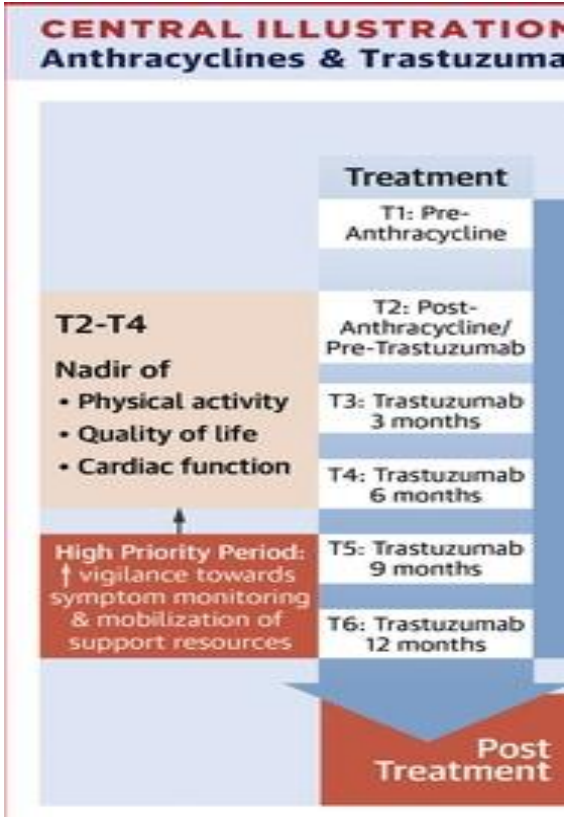
Objective: **To evaluate associations of self-reported moderate-to-vigorous physical activity (MVPA) during cancer treatment with concurrent measures in patients with HER2+ breast cancer.**

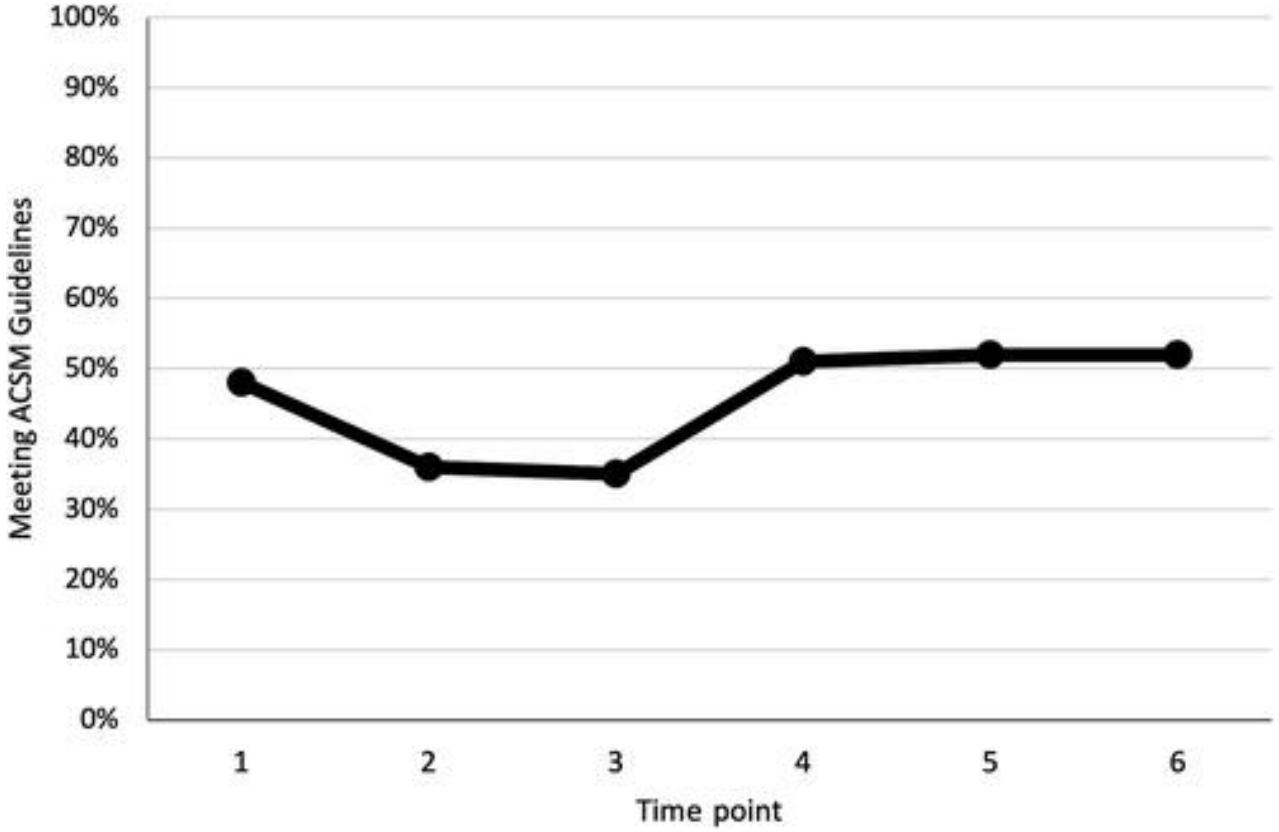
- quality of life (MLHFQ Minnesota Living With Heart Failure Questionnaire scores, EQ5D),
- cardiac function (SLG, LVEF),
- post-treatment cardiorespiratory fitness

Complete Qol questionnaires (EQ 5D, Minesota), physical activity, and cardiac imaging every three months, during treatment and after treatment

- 90 min AP / week = Active
- 88 patients 51.4 years +/-8.9 years (average age)

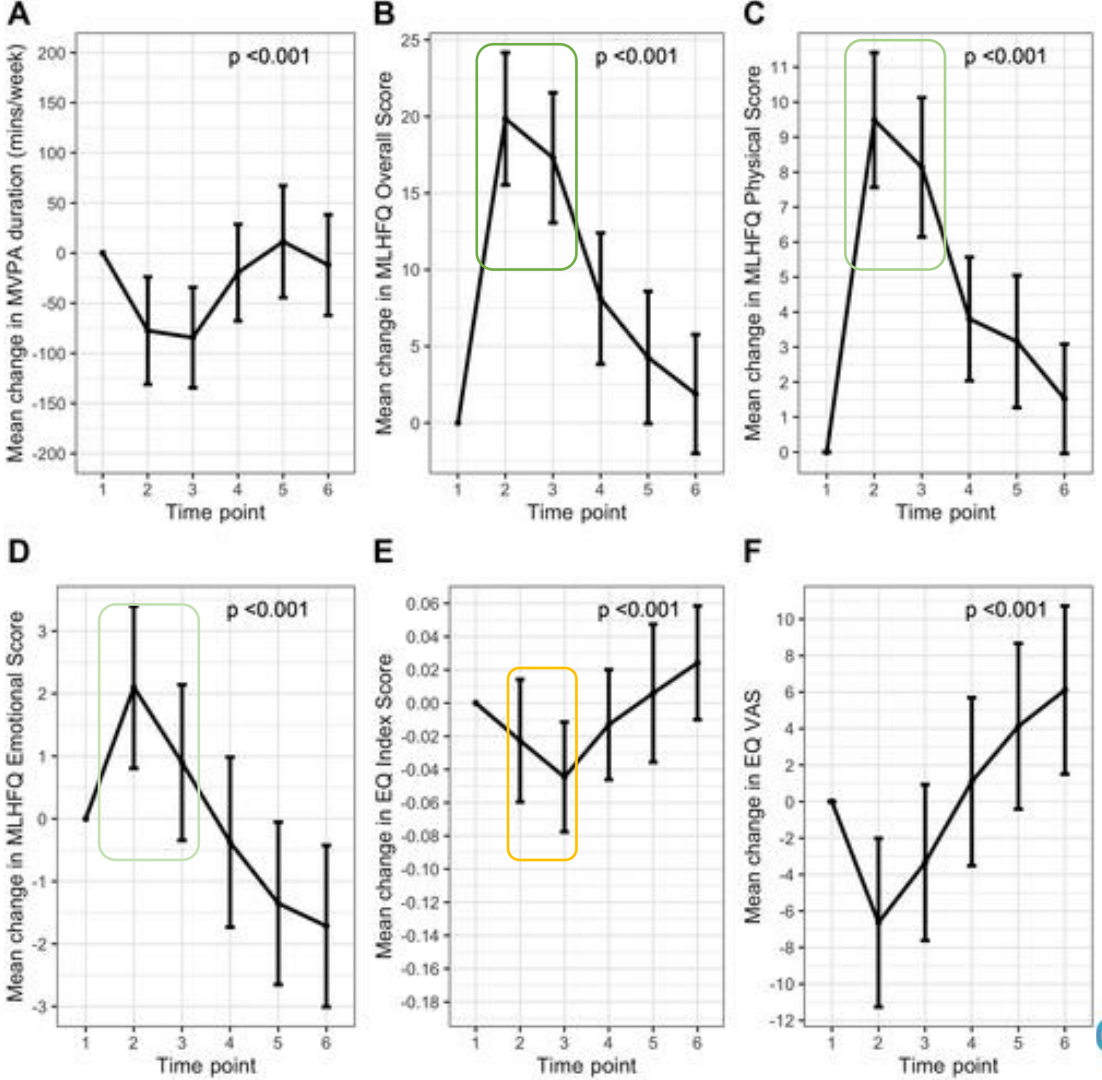
Peck S. and al. JACC CardioOncol. 2022





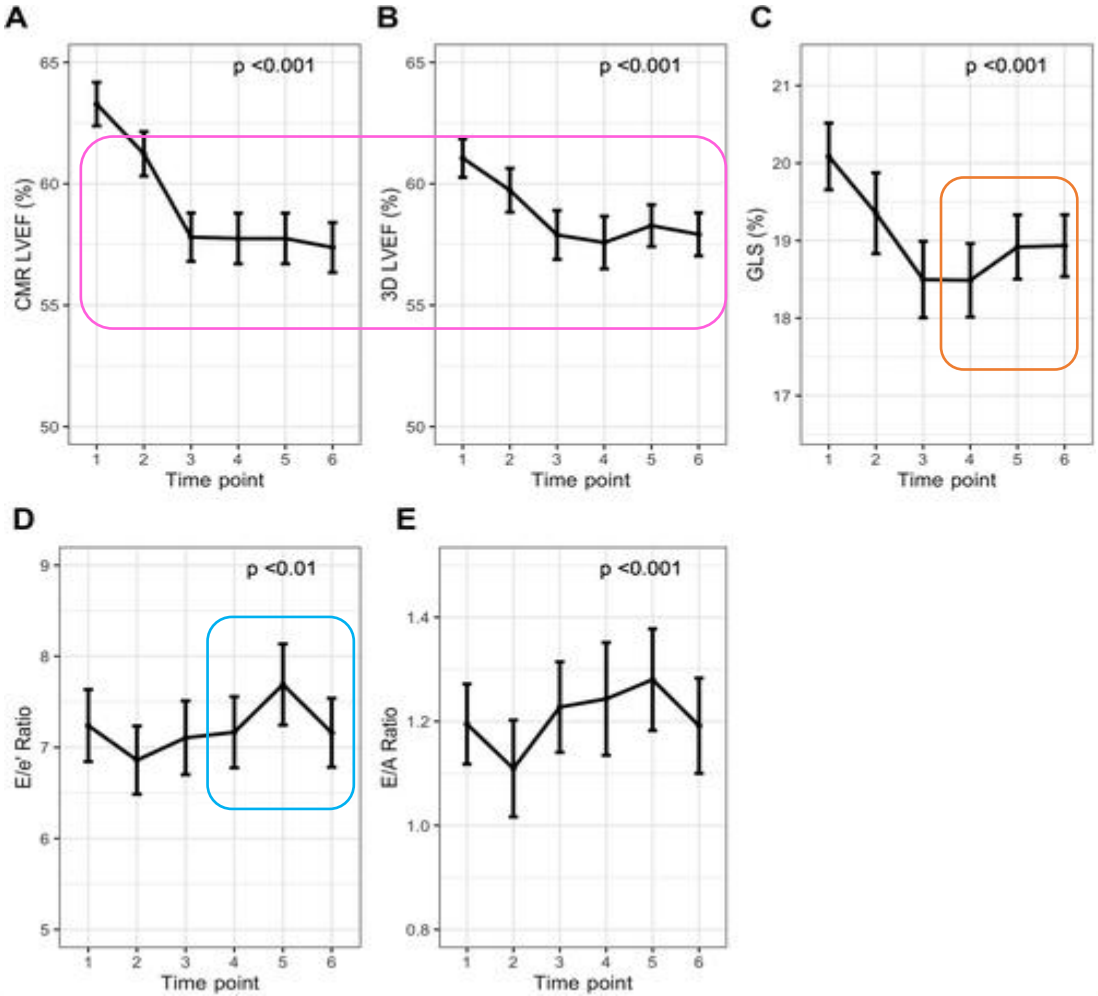
Proportion of Active Participants at Each Time Point During Treatment: Active participants engaged in ≥90 minutes of moderate to vigorous physical activity. The proportion meeting this target was the lowest at time points 2 and 3. ACSM = American College of Sports Medicine.

Peck S. and al. JACC CardioOncol. 2022



Mean Changes From Baseline for MVPA and QoL
Largest changes in **(A)** MVPA and **(B to F)** QoL measures occurred at time points 2 and 3.

Peck S. and al. JACC Cardio Oncol. 2022



CMR LVEF and Echocardiographic Measures During Treatment.

Peck S. and al. JACC Cardio Oncol. 2022

Breast cancer, ATC, Anti HER2 +: EMBRACE MRI 1(during and after treatment)

Association Between Overall Physical Activity Status During Cancer Treatment and Post-Treatment Cardiorespiratory Fitness

Overall PA Status	n	Active at Baseline[a]	Active ≥1 Visit Between Time Points 2 and 4[b]	Mean Vo_{2peak} (mLO_2/kg/min)	Univariable Association, Coefficient (95% CI)	*P* Value	Multivariable Association, Coefficient [95% CI][c]	*P* Value
Inactive	27	6 (22%)	3 (11%)	16.2	—	—	—	—
Somewhat active	35	22 (63%)	31 (89%)	19.1	2.82 (0.72 to 4.92)	0.009	2.66 (0.69 to 4.63)	0.009
Highly active	26	26 (100%)	26 (100%)	23.6	7.39 (5.14 to 9.64)	<0.001	5.74 (3.51 to 7.96)	<0.001

Peck S. and al. JACC CardioOncol. 2022

When should a cancer patient undergoing treatment exercise to improve his cardio-respiratory fitness?

During? Or after? Or during and after?

Randomised study

158 inactive patients

Breast cancer

Adjuvant or neoadjuvant chemotherapy

- *Usual care*
- *Concurrent (during chemotherapy)*
- *Sequential (after chemotherapy)*
- *Concurrent and sequential ? (continuous, during and after chemotherapy)*

Key question(s)	Key finding(s)
What is the most appropriate timing of exercise therapy (ETx) to improve cardiorespiratory fitness (CRF) in cancer patients initiating adjuvant chemotherapy?	In this randomized controlled trial of 158 patients with primary breast cancer, concurrent (during chemotherapy only) and sequential (after chemotherapy only) had similar CRF benefit.

Scott J and al. Eur Heart J 2023.

Physical activity:

- *Treadmill 3 times per week*
- 20/50 minutes at 55/100% of peak VO2
- 16 weeks during or after chemotherapy (sequential and concurrent)
- 32 weeks during and after treatment (continuous)

Primary End-point:

- ✓ *evaluation of peak VO2*
- ✓ *pre-treatment (T0)*
- ✓ *Immediately after chemotherapy (T1)*
- ✓ *16 weeks after chemotherapy T2 then 32 weeks*

Scott J and al. Eur Heart J 2023.

When should a cancer patient undergoing treatment exercise to improve his cardio-respiratory capacity?

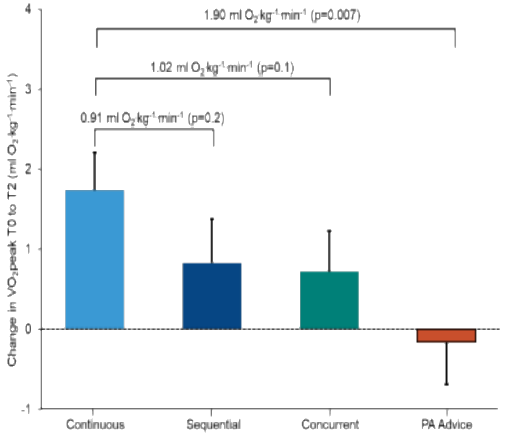
Usual Care vs. During, After, and Continuous Exercise in Newly Diagnosed Breast Cancer Patients

- n=158 breast cancer patients receiving chemotherapy

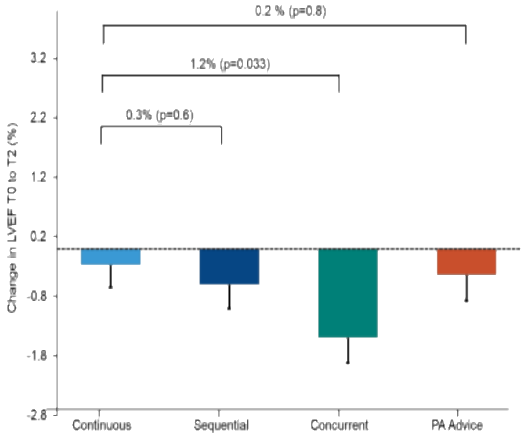
Randomized to ~32 weeks of:

- PHYSICAL ACTIVITY ADVICE
- CONCURRENT EXERCISE
- SEQUENTIAL EXERCISE
- CONTINUOUS EXERCISE

Primary Endpoint: VO_2peak



Secondary Endpoint: LVEF



Scott J and al. Eur Heart J 2023.

Table. Comparison of FRS Variables Between Exercise and Usual Care Groups[a]

Variable	Baseline, Mean (SD)	Postintervention		Postintervention Between-Group Difference	
		Mean (SD)	*P* Value[b]	Mean (95% CI)	*P* Value[c]
SBP, mm Hg					
Exercise	132.9 (13.0)	120.7 (9.5)	.001	−13.7 (−16.5 to −8.7)	.001
Usual care	133.7 (9.7)	135.9 (9.8)	.22		
FRS preset point for SBP[d]					
Exercise	0.0 (2.0)	−3.0 (2.0)	<.001	−3.0 (−5.0 to −1.0)	.002
Usual care	0.0 (2.0)	0.0 (2.0)	>.99		
HDL-C, mg/dL					
Exercise	43.1 (6.6)	64.7 (7.8)	.001	24.4 (27.9 to 17.9)	.001
Usual care	41.0 (4.3)	39.9 (4.0)	.45		
FRS preset point for HDL-C[d]					
Exercise	2.0 (1.0)	−2.0 (1.5)	<.001	4.0 (0.5 to 6.0)	<.001
Usual care	2.0 (1.0)	2.0 (2.0)	.97		
LDL-C, mg/dL					
Exercise	167.9 (19.7)	119.3 (12.1)	<.001	−48.6 (−61.2 to −27.6)	.001
Usual care	172.4 (20.3)	178.3 (21.7)	.59		
FRS preset point for LDL-C[d]					
Exercise	2.0 (1.0)	0 (1.0)	.002	−2.0 (−4.5 to −0.5)	.001
Usual care	2.0 (1.0)	2 (1.0)	.98		
Diagnosis of diabetes, No. (%)					
Exercise	20 (40)	10 (20)	<.001	−10.0 (−18.2 to −6.4)	<.001
Usual care	22 (44)	24 (53)	.45		
FRS preset point for diabetes[d]					
Exercise	2.0 (1.5)	1.0 (0.5)	.001	−1.0 (−2.5 to −0.5)	.003
Usual care	2.0 (1.0)	3.0 (1.0)	.21		
Total FRS					
Exercise	12.0 (2.0)	2.0 (1.5)	<.001	−9.5 (−13.0 to −6.0)	<.001
Usual care	12.0 (2.0)	13.0 (3.0)	.67		
FRS-predicted 10-y risk, %					
Exercise	13.0 (3.0)	2.0 (0.5)	<.001	−11.0 (−15.0 to −5.0)	<.001
Usual care	13.0 (3.0)	13.0 (3.0)	.97		

Abbreviations: FRS, Framingham Risk Score; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; SBP, systolic blood pressure.

[a] Two of the 6 groups (age and smoking status) did not apply in this comparison.

[b] *P* value for repeated-measures analysis of variance comparing changes in the exercise group and in the usual care group from baseline to postintervention.

[c] *P* value for mixed-model analysis comparing changes between the exercise and usual care group from baseline to postintervention.

[d] Assigned preset point for the respective variable based on calculating the FRS to assess FRS-predicted 10-year cardiovascular disease risk.

Lee K, Tripathy D, Demark-Wahnefried W, Courneya KS, Sami N, Bernstein L, et al.
Effect of aerobic and resistance exercise inter-vention on cardiovascular disease risk in
women with early-stage breast cancer: a randomized clinical trial.
JAMA Oncol 2019;5 (5):710–4.

50 femmes UC /50 femmes AP
55% origine hispanique
Moyenne âge 53,5 ans +/-10,4

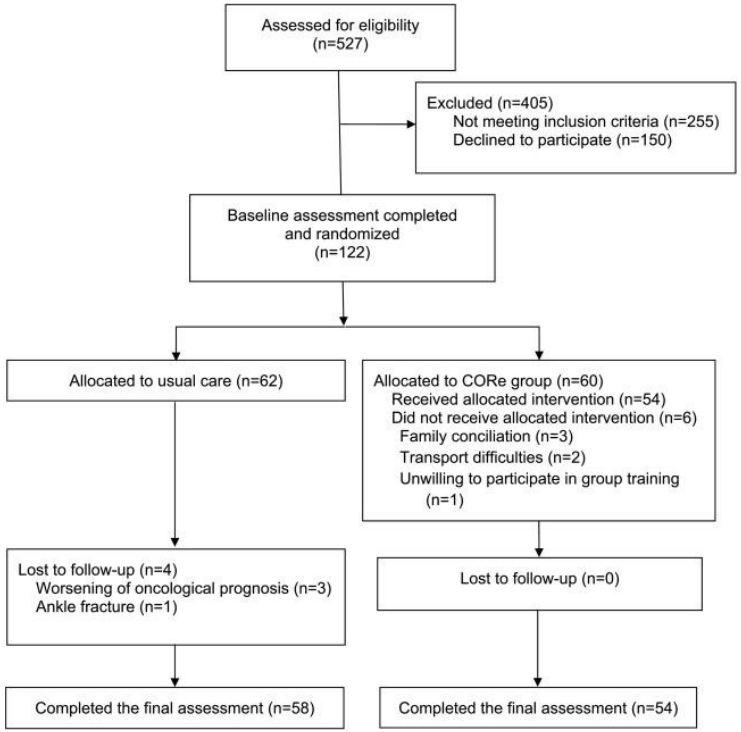
J1 et 3:résistance et aérobie
80 minutes
J2: 50 min aérobie (65% à 80% FC max)
Reduction Sd metabolique chez les patientes en surpoids

AP: Aérobie: Marche, rameur, bicyclette ergométrique
Résistance: presses mb inf, Extension, flexion mb inf, presse mb sup,
Seated row, RM: biceps, triceps
60%/80% FMMax.

Am coll of sports medicine/am Cancer society exercise guidelines for cancer survivors
> ou = 150 min ap aérobie
2/3 fois par semaine

- **Per ATC +/-Anti HER2**
- 122 women with breast cancer
- Stade I and II
- UC (PA recommandation) Vs CO-Re (Aerobic/resistance,

in cardiovascular rehabilitation center)



Diaz-Balboa E. and al. Prog Cardiovasc Dis. 2024

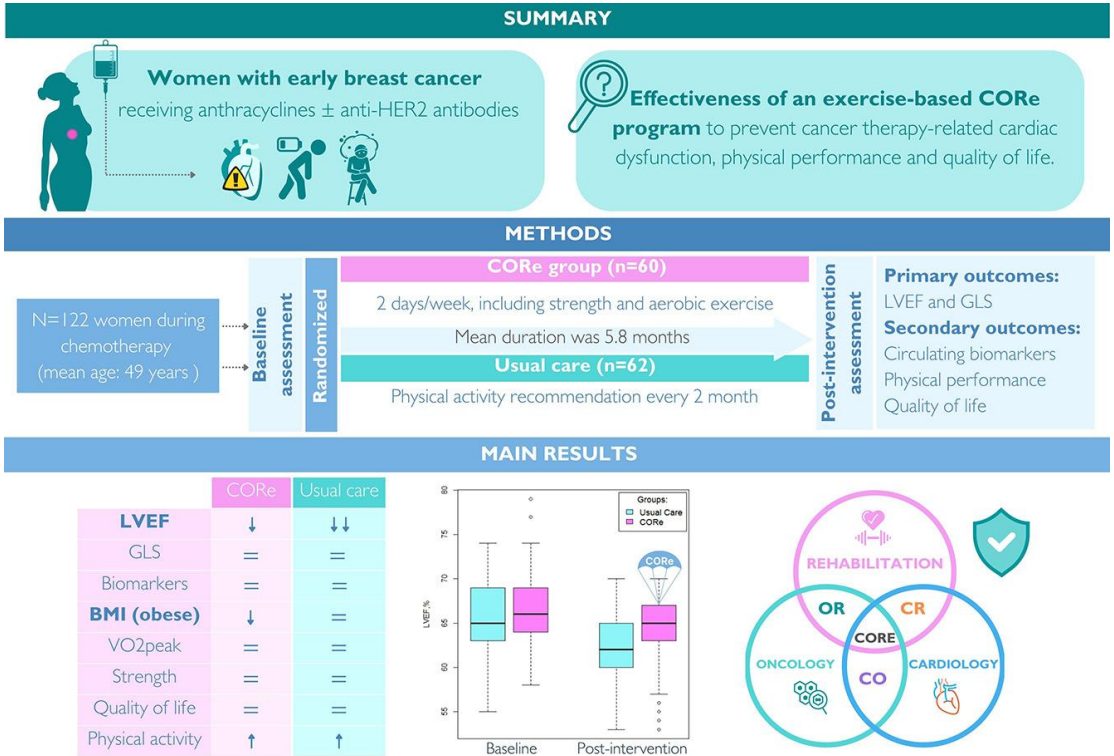
Clinical study: ONCORe Pre/Per-chemotherapy

Programme CO-Re

Significant attenuation of LVEF decline

Even in the absence of official criteria of CTRCD (IC)

Significant weight reduction in obese patients



CORe LVEF [−1,5 % (−2,9, −0,1) ; p = 0,006]

Diaz-Balboa E. and al. Prog Cardiovasc Dis. 2024

CO-Re (CBCR) Vs Usal Care (CBET)

- **75 randomized patients**
- UC Arm Vs CO-Re
- 53 years of average age +/- 12 years
- Intention to treat
- Stop Treatment 2 months before inclusion

✓ High dose ATC
✓ High dose radiotherapy
✓ Low dose ATC. + anti HER2
✓ Atcd ischemic CM
✓ Moderately altered fevg or < 50% and 2 fdrcv
✓ No CV Rehabilitation before

❖ 8 weeks
❖ CO-Re Aerobic, resistance, relaxation, diet, psycho, Education CVRf
❖ Community group UC: Aerobic, resistance, supervised

Table 1. Baseline Characteristics of Participants

Characteristic	Patients[a] CBCR (n = 38)	CBET (n = 37)
Age, mean (SD), y	54.5 (13.5)	53.8 (10.7)
Sex		
Female	29 (76.3)	29 (78.4)
Male	9 (23.7)	8 (21.6)
Marital status		
Single	3 (7.9)	4 (10.8)
Married	29 (76.3)	27 (73.0)
Divorced	4 (10.5)	6 (16.2)
Widowed	2 (5.3)	0
Highest educational level		
Elementary school	23 (60.5)	15 (40.5)
High school	12 (31.6)	16 (43.2)
University graduate	3 (7.9)	5 (13.5)
Postgraduate degree	0	1 (2.7)
Work situation		
Employed	23 (60.5)	16 (43.2)
Unemployed	7 (18.4)	12 (32.4)
Retired	8 (21.1)	9 (24.3)
Type of cancer		
Breast	24 (63.1)	26 (70.3)
Colorectal	1 (2.6)	1 (2.7)
Gastric	1 (2.6)	0
Prostate	1 (2.6)	1 (2.7)
Lymphoma	11 (28.9)	9 (24.3)
Solid tumor		
Any	28 (73.7)	27 (73.0)
Stage I	12 (31.6)	16 (43.2)
Stage II	11 (28.9)	5 (13.5)
Stage III	3 (7.9)	6 (16.2)
Stage IV	2 (5.3)	0
Time elapsed between cancer diagnosis and study enrollment, median (IQR), mo	27.0 (14.0-45.5)	25.0 (17.5-38.5)
Cancer treatment		
Chemotherapy	36 (94.7)	34 (91.9)
Anthracyclines[b]	33 (86.8)	31 (83.8)
Cumulative dose of anthracyclines, mean (SD), mg/m^2	265.9 (76.4)	251.7 (44.9)
Thoracic radiotherapy	24 (63.2)	24 (64.9)
Radiotherapy dose, mean (SD), Gy	46.7 (6.3)	44.3 (7.4)
Surgery	26 (68.4)	26 (70.3)
Adjuvant hormonal therapy		
Any	22 (57.9)	21 (56.8)
Tamoxifen	6 (15.8)	12 (32.4)
Tamoxifen plus goserelin	3 (7.9)	3 (8.1)
Exemestane plus goserelin	1 (2.6)	0
Letrozol	12 (31.6)	6 (16.2)
Trastuzumab	5 (13.2)	2 (5.4)
Pertuzumab	3 (7.9)	1 (2.7)

Table 1. Baseline Characteristics of Participants (continued)

Characteristic	Patients[a] CBCR (n = 38)	CBET (n = 37)
Cardiovascular risk factors		
Diabetes	1 (2.6)	2 (5.4)
Hypertension	15 (39.5)	13 (35.1)
Dyslipidemia	19 (50.0)	20 (54.0)
Smoking habits	4 (10.5)	5 (13.5)
Depression	12 (31.6)	9 (24.3)
Overweight	18 (47.3)	14 (37.8)
Obesity	12 (31.6)	10 (27.0)
Other comorbidities		
Ischemic heart disease	3 (7.9)	4 (10.8)
Atrial fibrillation	0	1 (2.7)
Heart failure	4 (10.5)	4 (10.8)
Valvular disease	1 (2.6)	0
Implantable cardioverter-defibrillator	1 (2.6)	1 (2.7)
Respiratory diseases[c]	6 (15.8)	5 (13.5)
Musculoskeletal disease[d]	7 (18.4)	7 (18.9)
Other[e]	5 (13.2)	4 (10.8)
Left ventricular ejection fraction, mean (SD)	55.6 (12.4)	55.6 (8.6)
Medication		
Anticoagulants	0	1 (2.7)
Antiplatelet therapy	2 (5.3)	3 (8.1)
β-Blockers	5 (13.2)	5 (13.5)
Anxiolytics	11 (28.9)	10 (27.0)
Antidepressants	12 (31.6)	9 (24.3)
Diuretics	7 (18.4)	7 (18.9)
Statins	16 (42.1)	14 (37.8)
Nitrates	0	1 (2.7)
Fibrates	2 (5.3)	2 (5.4)
ACEI	5 (13.2)	6 (16.2)
ARA II	4 (10.5)	6 (16.2)
Sacubitril or valsartan	2 (5.3)	0
Calcium channel blockers	4 (10.5)	1 (2.7)
Insulin	0	1 (2.7)
Antidiabetic agents[f]	1 (2.6)	2 (5.4)

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARA II, angiotensin II receptor antagonists; CBCR, center-based cardiac rehabilitation; CBET, community-based exercise treatment.

[a] Data are presented as the number (percentage) of patients unless otherwise indicated.

[b] Anthracyclines and radiotherapy were given sequentially.

[c] Asthma and chronic obstructive pulmonary disease.

[d] Degenerative joint disease.

[e] Thyroid diseases, hepatitis, HIV infection, obstructive sleep apnea, chronic kidney disease, peripheral arterial disease, vertiginous syndrome.

[f] Excluding insulin.

group (mean [SD] increase, 0.1 [1.4] points) ($P < .001$), with a mean between-group difference of 2.6 points (95% CI, 1.9-3.3

Viamonte S et al. JAMA Cardiology 2023

Compliance:
90% CO-Re
Vs 68%

With valid reason
0.8% (CBCR)
Vs 14% CO-Re

Table 3. Blood Pressure, Heart Rate, Physical Activity, Lipid Profile, Inflammatory Markers, Psychological Symptoms, Health Literacy, and Health-Related Quality-of-Life Changes After the 8-Week Intervention

	CBCR (n = 38)				CBET (n = 37)					
	Mean (SD)				Mean (SD)				Between-group difference	
Metric	Baseline	Postintervention	Change from baseline	*P* value	Baseline	Postintervention	Change from baseline	*P* value	Mean (95% CI)	*P* value
Resting SBP, mm Hg	127.1 (18.9)	114.8 (13.8)	−12.3 (11.8)	<.001	123.9 (20.2)	122.0 (14.7)	−1.9 (12.9)	.39	−10.4 (−16.1 to −4.7)	<.001
Resting DBP, mm Hg	81.5 (8.4)	76.5 (7.8)	−5.0 (5.7)	<.001	81.4 (11.0)	80.9 (8.7)	−0.5 (7.0)	.70	−4.5 (−7.5 to −1.6)	.003
Resting heart rate, bpm	81.2 (13.6)	75.3 (11.3)	−5.9 (6.5)	<.001	82.0 (13.3)	83.7 (12.3)	1.7 (8.2)	.22	−7.6 (−11.0 to −4.2)	<.001
Total cholesterol level, mg/dL	182.1 (36.9)	167.1 (26.3)	−15.0 (27.8)	.002	178.1 (33.1)	186.7 (33.4)	8.6 (32.6)	.12	−23.6 (−37.6 to −9.7)	.001
Triglyceride levels, mg/dL	125.2 (60.0)	93.0 (32.6)	−32.3 (40.4)	<.001	152.0 (105.6)	154.9 (113.9)	2.9 (68.0)	.80	−35.2 (−60.8 to −9.5)	.008
HDL cholesterol level, mg/dL	53.3 (12.9)	54.3 (10.5)	1.0 (7.4)	.41	53.2 (13.3)	52.6 (14.2)	−0.6 (7.5)	.60	1.6 (−1.8 to 5.1)	.34
LDL cholesterol level, mg/dL	107.0 (32.3)	92.8 (24.5)	−14.2 (29.4)	.005	101.0 (32.3)	105.1 (28.6)	4.2 (21.6)	.25	−18.3 (−30.2 to −6.5)	.003
IL-6 level, pg/mL	5.2 (6.2)	4.8 (5.7)	−0.5 (2.0)	.19	3.6 (5.1)	5.1 (5.5)	1.5 (5.5)	.15	−2.0 (−4.0 to 0.1)	.06
HSCRP level, mg/dL	0.35 (0.39)	0.26 (0.29)	−0.08 (0.39)	.18	0.29 (0.46)	0.41 (0.72)	0.12 (0.66)	.35	−0.2 (−0.5 to 0.1)	.12
Physical activity, METs/min/wk	349.6 (530.6)	1384.7 (893.9)	1035.2 (735.7)	<.001	519.7 (467.9)	553.8 (608.1)	34.1 (424.4)	.63	1001.1 (719.8 to 1282.8)	<.001
HADS score										
Anxiety	7.9 (4.6)	5.3 (3.9)	−2.6 (2.7)	<.001	8.2 (4.3)	7.4 (4.2)	−0.8 (2.3)	.03	−1.8 (−2.9 to −0.6)	.003
Depression	6.0 (4.4)	3.3 (3.2)	−2.7 (3.0)	<.001	6.3 (4.0)	5.8 (3.7)	−0.5 (2.2)	.21	−2.2 (−3.7 to −0.6)	.009
EQ-5D-5L health state score	68.3 (15.2)	82.3 (9.5)	14.0 (10.0)	<.001	70.3 (15.7)	70.7 (16.1)	0.4 (12.9)	.85	13.6 (8.3 to 18.9)	<.001
Health literacy score[a]	1.6 (1.8)	4.3 (1.2)	2.7 (1.6)	<.001	1.7 (2.0)	1.8 (2.1)	0.1 (1.4)	.81	2.6 (1.9 to 3.3)	<.001

Abbreviations: CBCR, center-based cardiac rehabilitation; CBET, community-based exercise treatment; DBP, diastolic blood pressure; EQ-5D-5L, European Quality of Life 5 Dimensions questionnaire; HADS, Hospital Anxiety and Depression Score; HDL, high-density lipoprotein; HSCRP, high-sensitivity C-reactive protein; IL-6, interleukin 6; LDL, low-density lipoprotein; MET, metabolic equivalents; SBP, systolic blood pressure.

SI conversion factors: To convert HDL, LDL, and total cholesterol to mmol/L, multiply by 0.0259 and triglycerides to mmol/L, by 0.0113.

[a] Assessed by the Newest Vital Sign instrument.

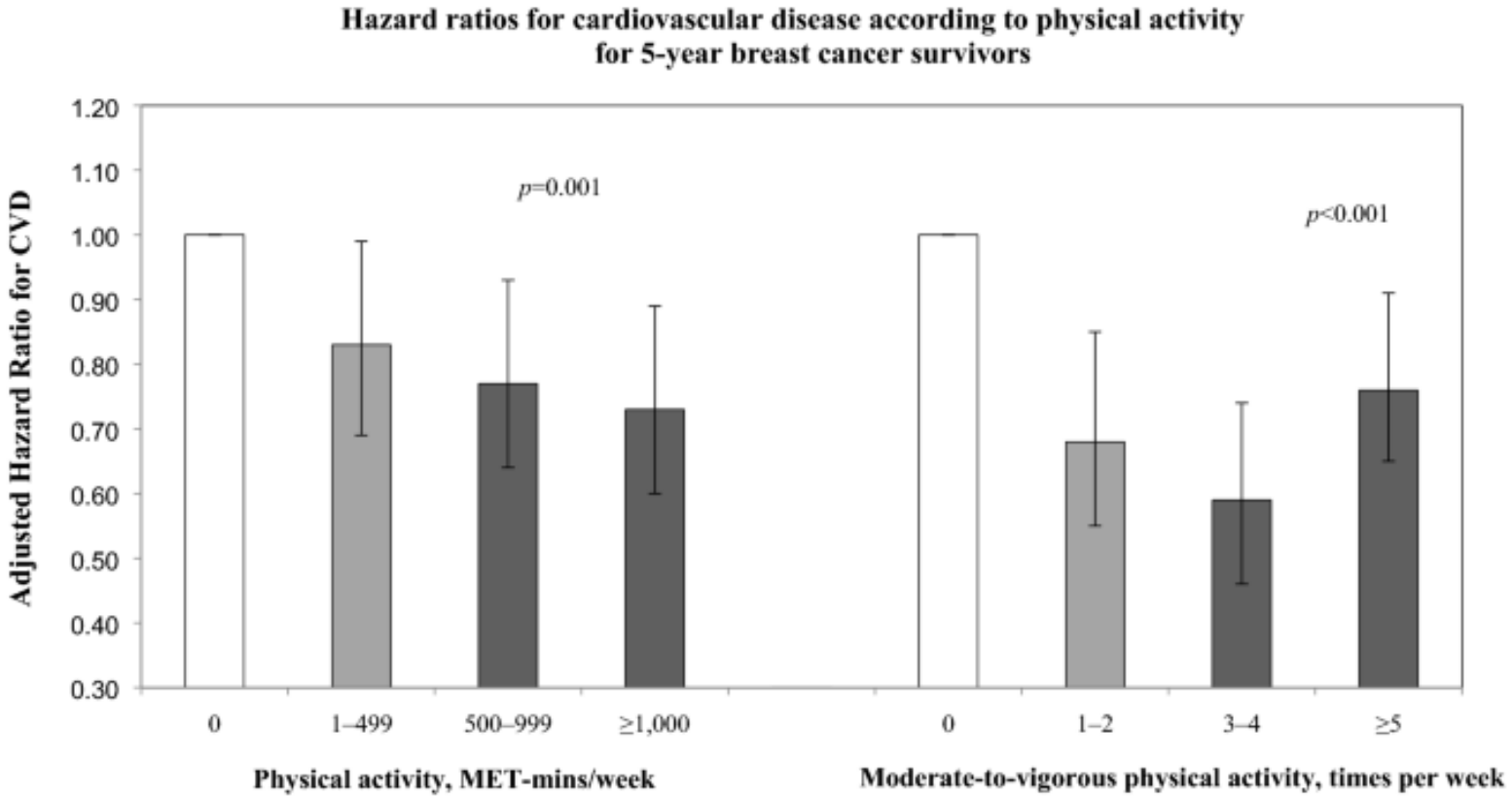
Viamonte S et al. JAMA Cardiology 2023

Table 2. Body Composition, Handgrip Strength, and Physical Function Changes After the 8-Week Intervention

Metric	CBCR (n = 38) Mean (SD) Baseline	Postintervention	Change from baseline	*P* value	CBET (n = 37) Mean (SD) Baseline	Postintervention	Change from baseline	*P* value	Between-group difference Mean (95% CI)	*P* value
Peak $\dot{V}O_2$, mL/kg/min	24.4 (7.0)	26.5 (7.5)	2.1 (2.8)	<.001	23.8 (6.2)	24.5 (6.0)	0.8 (2.5)	.07	1.3 (0.1 to 2.6)	.03
Exercise test duration, s	583.4 (141.6)	689.3 (142.9)	105.8 (64.0)	<.001	574.0 (175.5)	621.2 (156.6)	47.3 (64.2)	<.001	58.6 (28.9 to 88.3)	<.001
Weight, kg	75.0 (14.0)	72.1 (13.1)	−2.9 (2.6)	<.001	74.1 (14.8)	74.4 (14.6)	0.3 (1.6)	.22	−3.2 (−4.2 to −2.2)	<.001
BMI	27.7 (5.0)	26.6 (4.7)	−1.2 (0.9)	<.001	27.1 (4.7)	27.3 (4.7)	0.2 (0.7)	.10	−1.4 (−1.7 to −1.0)	<.001
Lean mass, kg	25.6 (4.0)	28.4 (5.5)	2.8 (2.5)	<.001	25.6 (5.4)	25.6 (5.5)	−0.1 (1.2)	.74	2.9 (2.0 to 3.8)	<.001
Fat mass, kg	27.8 (11.5)	25.0 (10.8)	−2.9 (2.3)	<.001	26.9 (10.5)	27.3 (10.7)	0.4 (2.3)	.24	−3.3 (−4.4 to −2.3)	<.001
Waist circumference, cm	99.2 (10.2)	94.4 (9.8)	−4.8 (3.3)	<.001	97.4 (11.2)	96.7 (11.4)	−0.7 (2.9)	.18	−4.1 (−5.6 to −2.7)	<.001
Hip circumference, cm	106.8 (12.1)	102.5 (10.8)	−4.3 (3.3)	<.001	103.8 (10.0)	103.9 (9.6)	0.1 (2.9)	.87	−4.4 (−5.8 to −3.0)	<.001
IHG, kgf										
Dominant hand	34.5 (7.2)	37.2 (7.2)	2.7 (2.4)	<.001	33.7 (9.7)	35.3 (8.5)	1.6 (3.4)	.01	1.0 (−0.3 to 2.4)	.13
Nondominant hand	31.6 (6.7)	33.7 (7.0)	2.1 (2.4)	<.001	31.6 (9.3)	33.3 (8.4)	1.6 (3.6)	.01	0.5 (−1.0 to 1.9)	.52
Sit-to-stand test, repetitions in 60 s, No.	32.0 (9.9)	42.7 (12.5)	10.7 (8.6)	<.001	30.9 (9.7)	32.9 (10.6)	2.0 (5.1)	.02	8.7 (5.5 to 12.0)	<.001

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); CBCR, center-based cardiac rehabilitation; CBET, community-based exercise treatment; IHG, isometric handgrip strength; kgf, kilogram-force; $\dot{V}O_2$, oxygen consumption.

Phase 3



Association between physical activity and subsequent cardiovascular disease among 5-year breast cancer survivors. Kim KH. and al. Breast Cancer Res Treat. 2021 Jul;188(1):203-214.

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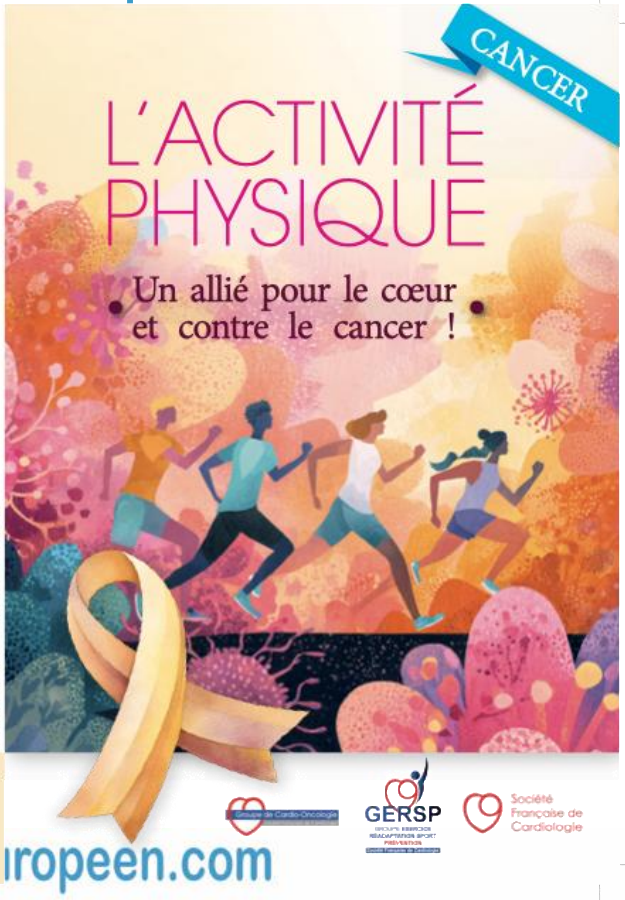
QUESTIONS PRATIQUES

PUIS-JE FAIRE DE L'ACTIVITÉ PHYSIQUE :

- **Si je suis fatigué(e) ?**
  Oui c'est possible en adaptant l'activité physique. Privilégiez les séances de mobilité et d'étirements à des séances de renforcement musculaire ou d'endurance. Le niveau perçu de fatigue peut diminuer de 25 à 40 % ! C'est l'une des seules manières de diminuer la fatigue liée au cancer et au traitement !
- **Si je commence la chimiothérapie ?**
  Oui c'est même conseillé en adaptant l'activité physique à son état quotidien, par exemple par une marche de 5 min une à plusieurs fois par jour.
- **Si je suis en cours de rayons ?**
  Oui, en évitant les activités aquatiques du fait du risque de sécheresse et d'infection de la peau.
- **Si j'ai des douleurs ?**
  En cas de douleur inhabituelle, il faut en parler à l'un de ses médecins mais beaucoup de douleurs sont des douleurs favorisées par les traitements et l'activité physique permet de réduire le niveau de douleur jusqu'à 50 % !
- **Si je n'aime pas faire de sport et que je n'en ai jamais fait ?**
  Ne pas confondre sport et activité physique ! On ne cherche pas la performance !
- **Quelle intensité est nécessaire pour qu'elle soit efficace ?**
  L'objectif est d'être un peu essoufflé durant l'effort (pouvoir dire 4/5mots) sans tenir une conversation complète.
- **Pourquoi conseillez-vous d'être encadré pour les séances ?**
  Si vous êtes déjà autonome pour la pratique de l'activité physique, vous pouvez continuer seul (e). Dans le cas où vous débutez une activité physique, les études montrent une meilleure efficacité et sécurité en étant encadré par un enseignant en activité physique adaptée ou un kiné.
- **Faut-il un certificat médical avant de débuter une activité physique ?**
  Cela peut être nécessaire, ou tout au moins une prescription de l'activité physique adaptée pour permettre d'adapter la pratique à l'état physique et à la maladie sous-jacente.
- **Y a-t-il un sport meilleur qu'un autre ?**
  Non, tout type d'activité physique en l'absence de contre-indication médicale est bénéfique : tennis, padel, escrime santé, rugby touch' santé, activités proposées par des associations spécialisées dans les soins de support oncologiques et la ligue contre le cancer... Vous pouvez continuer ou débuter après avis de votre oncologue.
- **Puis-je être remboursé (e) pour les séances d'activité physique ?**
  Il n'existe pas à ce jour de remboursement par la sécurité sociale des séances d'activité physique adaptée. Certaines séances d'activité physique adaptée réalisées par des kinésithérapeutes peuvent être en partie remboursées. Certaines mutuelles proposent aussi parfois un forfait. En centre de réadaptation, le réentrainement à l'effort est pris en charge par l'assurance maladie.
- **Avez-vous d'autres conseils pour améliorer ma santé ?**
  Une alimentation équilibrée et l'objectif zéro cigarette est important à garder en tête ! Vous pouvez demander conseil à une diététicienne et à un tabacologue.

Groupe de Cardio-Oncologie — GERSP Groupe Exercice Réadaptation Sport Prévention — Société Française de Cardiologie



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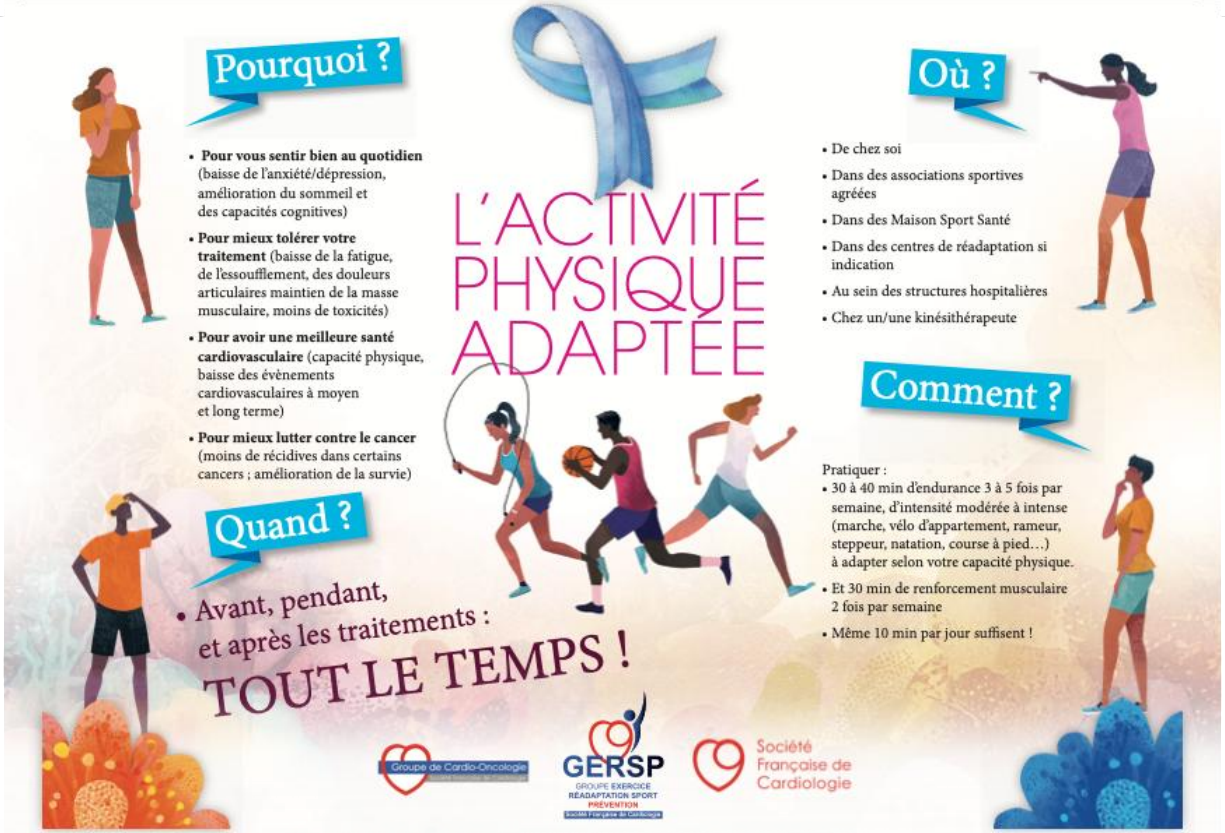

Take Home Messages

Un patient avec un cancer **a un pronostic:**

- **grevé par les ECV**
- **corrélé à son pic de VO2 abaissé en post Thérapeutique**

Proposer une AP **endurance et de résistance supervisée** dès l' annonce diagnostique et sur **tout le continuum** de la prise en charge du cancer

- Permet de **diminuer FDR (CV + cancer)** et les **ECV à court, moyen ou plus long terme**
- Permet d'améliorer le **pronostic CV par augmentation du pic de VO2** qui est aussi le reflet de la QdV
- Permet de **limiter la baisse de la FEVG lors de l'utilisation des Anthracyclines** (toxicité type 1) en limitant les **effets oxydants des ATC dans les mitochondries myocardiques**, en **diminuant la concentration des ATC dans les cardiomyocytes**
- Les **paramètres de fonction systolique VG et VD (repos, SLG et effort)** sont probablement améliorés mais cela nécessite plus d'études
- **En centre de RCV** : PEC pluridisciplinaire, l'encadrement AP, améliorent la compliance (chez des patients fatigués), améliorent sûrement les paramètres précédents (Risque CV et ECV/altération FEVG), éducation suivi CO + FDRCV, dépistage de cardiopathies précoces

Merci de votre attention

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