5th iHEF CARD

The 5th Indonesian Symposium on Heart Failure and Cardiometabolic Disease

Indonesian Working Group on Heart Failure and Cardiometabolic Disease

WHFS World Heart Failure Society

HEART FAILURE SOCIETY (SINGAPORE)

Cardiac Rehabilitation in Heart Failure: The Forgotten Science?

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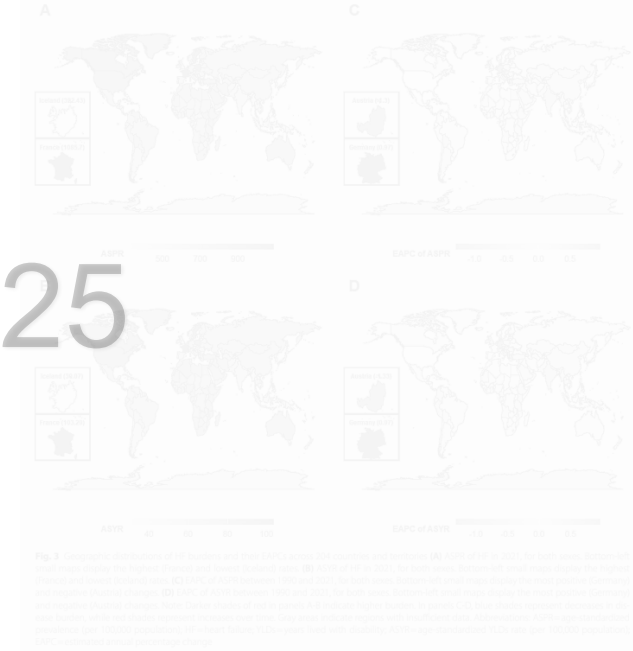
Outlines:

- Burden of Heart Failure
- Guidelines in Focus: Where Does CR Fit In?
- Cardiac Rehabilitation: Beyond Exercise, Toward Outcomes
- The Power of CR in HF: Updated Evidence
- Implementation Barrier
- Upcoming Innovations
- Key Takeaways



Burden of Heart Failure

- Indonesia's HF prevalence and disability burden are significant and have likely increased or plateaued over the last 30 years.
- Compared to many high-income countries that show declining trends (blue zones), Indonesia reflects the global LMIC pattern of rising HF burden driven by epidemiologic transitions.

Indonesia shows a ***moderate-to-high burden*** of heart failure in both **HF prevalence (A)** and **years lived with disability (B).**

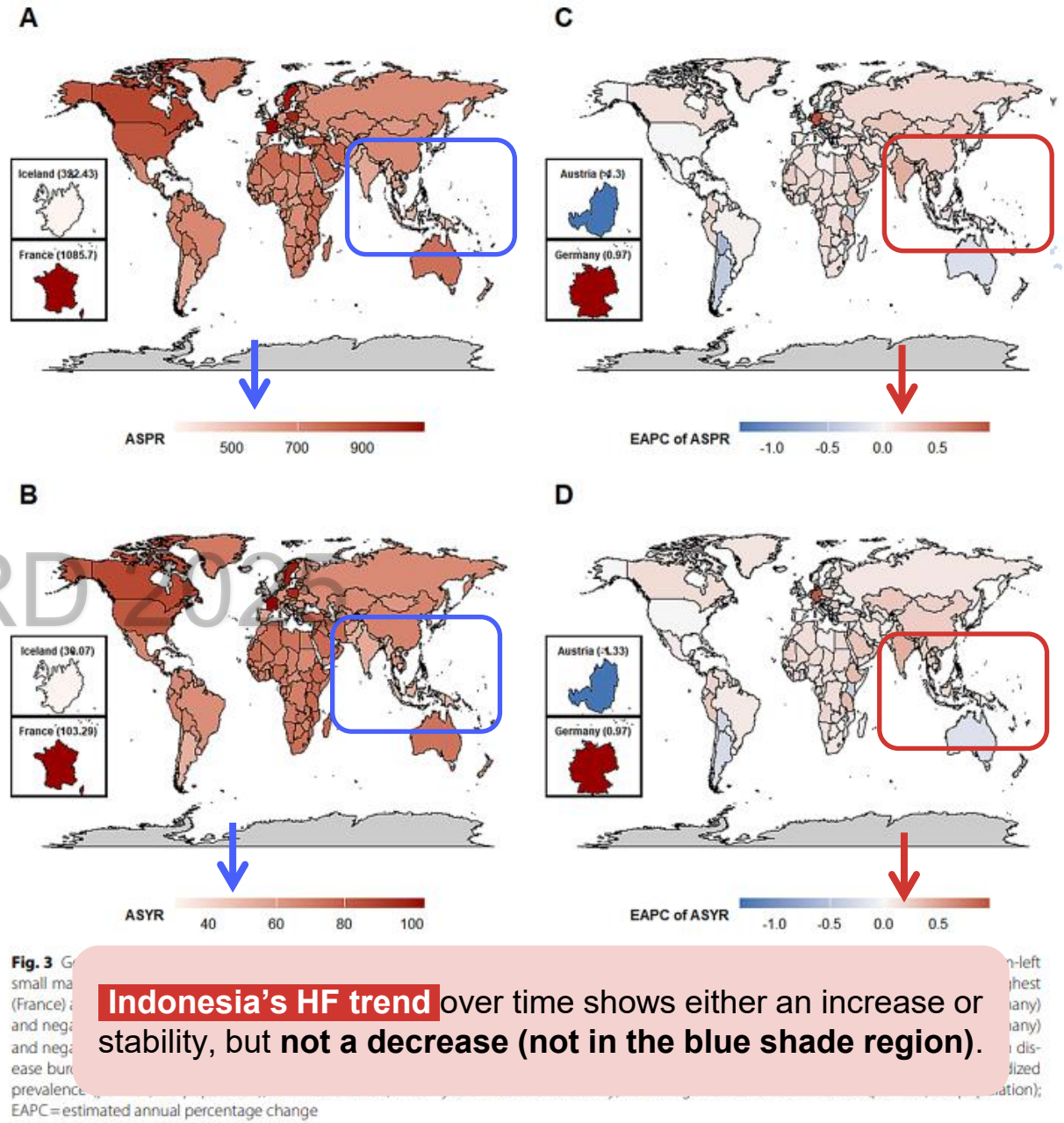
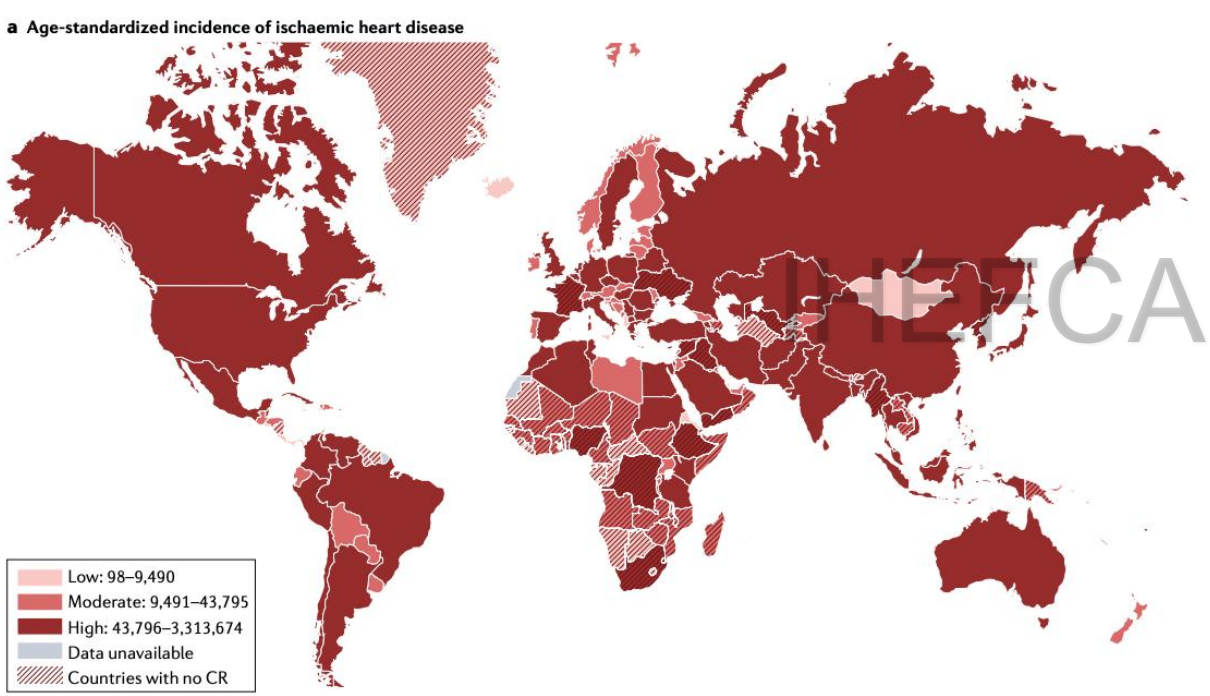


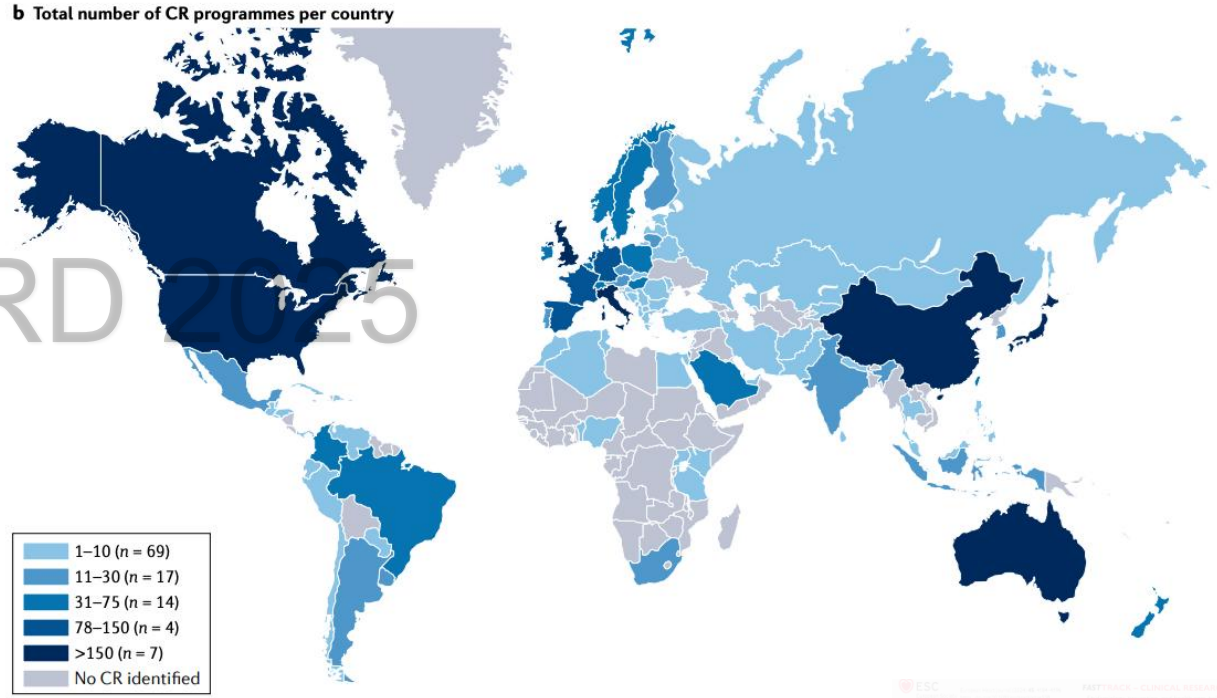
Fig. 3 G… small ma… (France) … and nega… and nega… ease bur… prevalence… EAPC = estimated annual percentage change

Indonesia's HF trend over time shows either an increase or stability, but **not a decrease (not in the blue shade region).**

Ran, Jun, et al. Global, regional, and national burden of heart failure and its underlying causes, 1990–2021: results from the global burden of disease study 2021. Biomarker Research 13.1 (2025): 16.

Cardiac Rehabilitation (CR) is available in **only approximately half of the countries of the world,** and, in broad terms, the *geographical distribution of CR* is **negatively correlated** with the incidence of *ischaemic heart disease as the most common cause of heart failure*

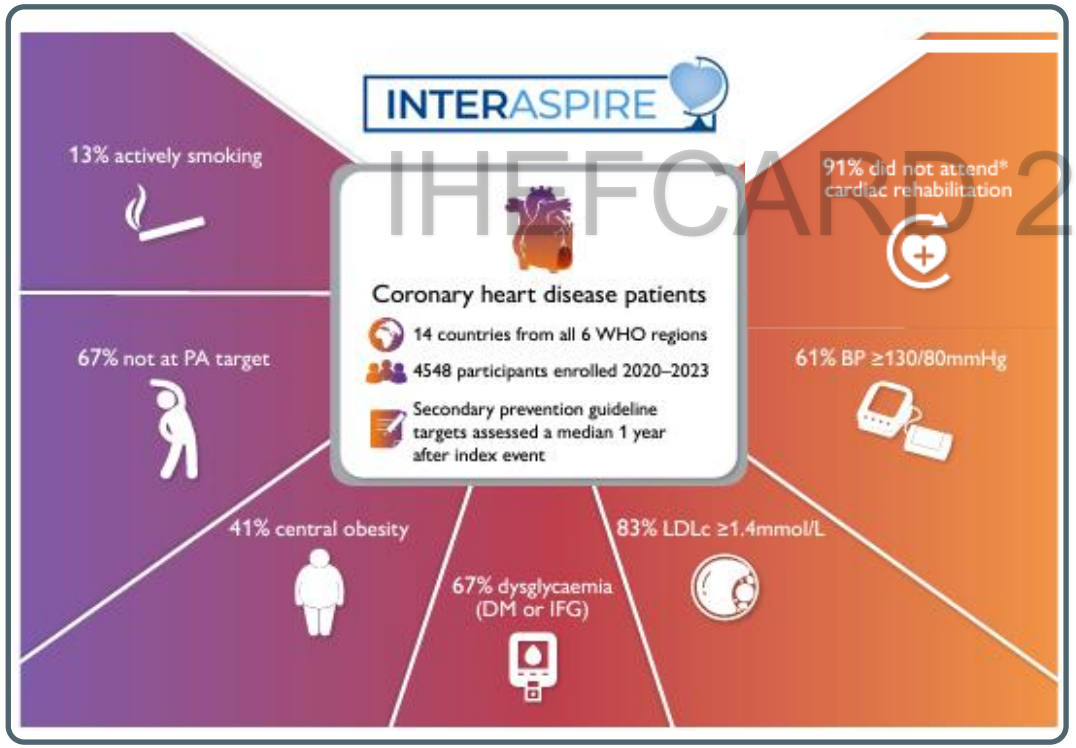




Taylor, R. S., Dalal, H. M., & McDonagh, S. T. (2022). The role of cardiac rehabilitation in improving cardiovascular outcomes. *Nature Reviews Cardiology*, *19*(3), 180-194.

Current Status of Cardiac Rehab for Heart Failure Patients

- Patient participation in cardiac rehabilitation *has been **persistently low**, even before the COVID-19 Pandemic*.
- Over the past 15 years, **referral and attendance rates in Europe and the United States** have remained **below 20%,** with some as low as 5%.
- **Moreover**,



ESC European Society of Cardiology
European Heart Journal (2024) 45, 4184–4196
https://doi.org/10.1093/eurheartj/ehae558
FASTTRACK – CLINICAL RESEARCH
Epidemiology, prevention, and health care policies

Variation in secondary prevention of coronary heart disease: the INTERASPIRE study

John William McEvoy[1]*, Catriona Jennings[1]*, Kornelia Kotseva[1,2], Dirk De Bacquer[3], Guy De Backer[3], Iris Erlund[4], Terhi Vihervaara[4], Gregory Y. H. Lip[5], Kausik K. Ray[6], Lars Rydén[7], Ana Abreu[8], Wael Almahmeed[9], Ade Meidian Ambari[10], Junbo Ge[11], Hosam Hasan-Ali[12], Yong Huo[13], Piotr Jankowski[14], Rodney M. Jimenez[15], Yong Li[16], Ahmad Syadi Mahmood Zuhdi[17], Abel Makubi[18], Amam Chinyere Mbakwem[19], Lilian Mbau[20], Jose Luis Navarro Estrada[21], Okechukwu Samuel Ogah[22], Elijah Nyainda Ogola[23], Adalberto Quintero–Baiz[24], Mahmoud Umar Sani[25], Maria Ines Sosa Liprandi[26], Jack Wei Chieh Tan[27,28,29], Miguel Alberto Urina Triana[30], Tee Joo Yeo[31], Sandra Ganly[1], Agnieszka Adamska[1], and David Wood[1,32]; on behalf of the INTERASPIRE Investigators

Cardiac Rehabilitation

The INTERASPIRE study, covering 14 countries across all six WHO regions, confirms this gap: **only 9% of patients with coronary heart disease participate in cardiac rehabilitation.**

McEvoy, John William, et al. Variation in secondary prevention of coronary heart disease: the INTERASPIRE study. *European Heart Journal* 45.39 (2024): 4184-4196.

Current Status of Cardiac Rehab for Heart Failure Patients

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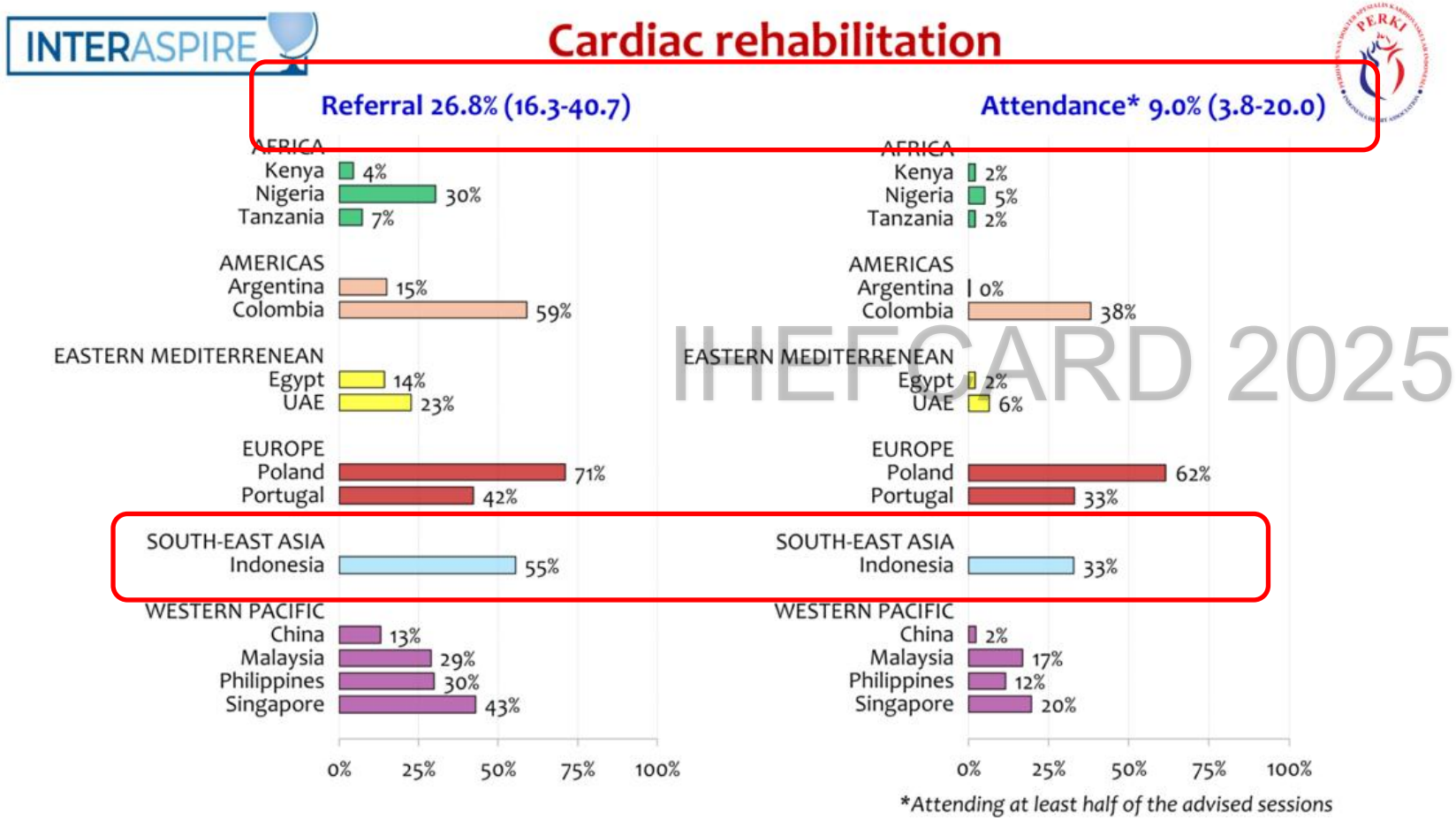

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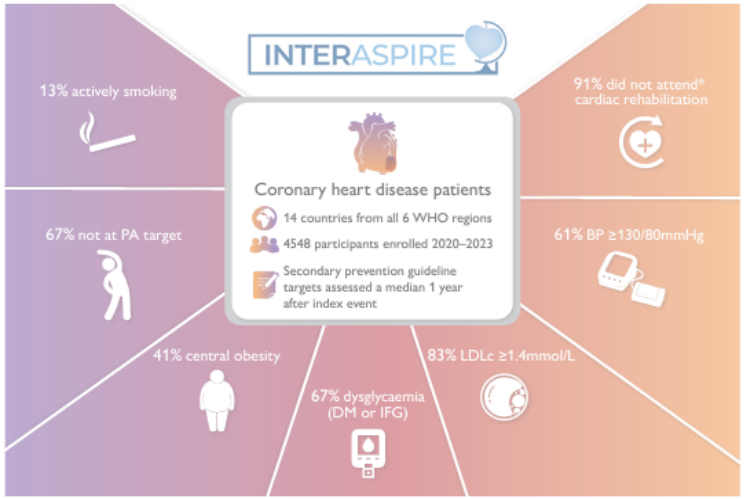

McEvoy, John William, et al. Variation in secondary prevention of coronary heart disease: the INTERASPIRE study. *European Heart Journal* 45.39 (2024): 4184-4196.

What is CR, and how does it fit into the guidelines?

- **Cardiac rehabilitation (CR)** is a complex intervention that includes a multidisciplinary program of exercise training, risk factor management, and psychosocial counseling for individuals with cardiovascular disease (CVD) (**Class IA recommendation**).
- **CR is designed not only to treat the physical effects** of CVD, but — as defined by the **World Health Organization (WHO)** — to *"favorably influence the underlying causes of disease and provide the best possible physical, mental, and social conditions, empowering patients to restore and maintain a meaningful role in their community."*

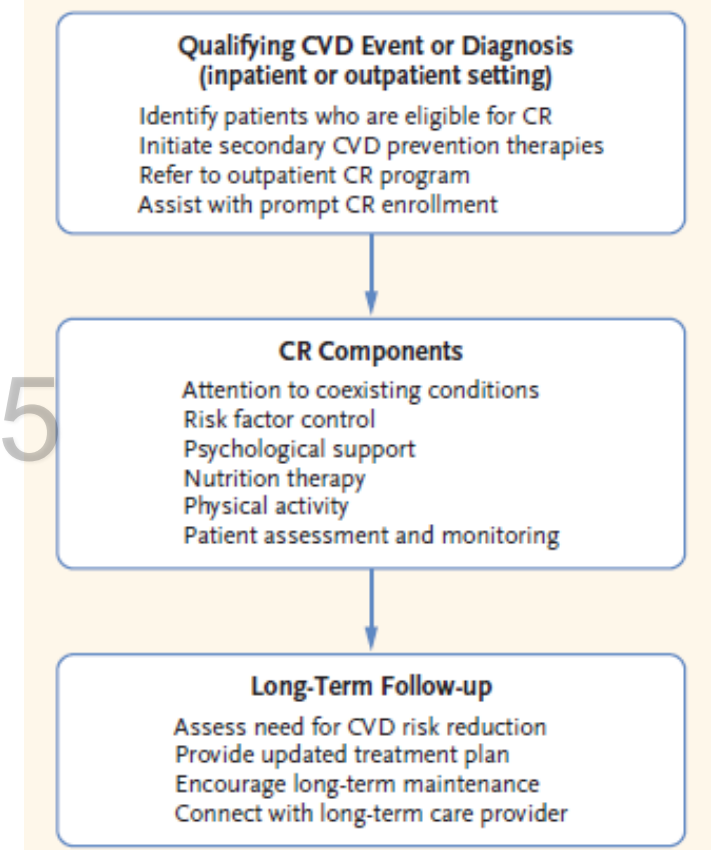

Figure 1. Cardiac Rehabilitation (CR) Pathway.

Beatty, A. L., Beckie, T. M., Dodson, J., Goldstein, C. M., Hughes, J. W., Kraus, W. E., ... & Franklin, B. A. (2023). A new era in cardiac rehabilitation delivery: research gaps, questions, strategies, and priorities. *Circulation*, *147*(3), 254-266.

Taylor, Rod S., Hasnain M. Dalal, and Ann-Dorthe Zwisler. Cardiac rehabilitation for heart failure: ' Cinderella ' or evidence-based pillar of care?. *European Heart Journal* 44.17 (2023): 1511-1518.

Jørgensen, T., Prescott, E.I.B. and ESC Scientific Document Group, 2022. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. *European Journal of Preventive Cardiology*, 29(1), 5-115.

Thomas, Randal J. Cardiac rehabilitation—challenges, advances, and the road ahead. *New England Journal of Medicine* 390.9 (2024): 830-841.

Guidelines in Focus: Where Does CR Fit In?

Cardiac rehabilitation fits in a Class IA recommendation in the ESC and ACC-AHA guidelines.

Recommendations for exercise rehabilitation in patients with chronic heart failure

Recommendations	Class[a]	Level[b]
Exercise is recommended for all patients who are able in order to improve exercise capacity, QOL, and reduce HF hospitalization.[c 324–328,335–337]	I	A
A supervised, exercise-based, cardiac rehabilitation programme should be considered in patients with more severe disease, frailty, or with comorbidities.[95,324–327,338]	IIa	C

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HF = heart failure; QOL = quality of life.
[a]Class of recommendation.
[b]Level of evidence.
[c]In those who are able to adhere to the exercise programme.

Recommendations for cardiac rehabilitation

Recommendations	Class[a]	Level[b]
Participation in a medically supervised, structured, comprehensive, multidisciplinary EBCR and prevention programme for patients after ASCVD events and/or revascularization, and for patients with HF (mainly HFrEF), is recommended to improve patient outcomes.[638–642]	I	A
Methods to increase CR and prevention referral and uptake should be considered (i.e. electronic prompts or automatic referrals, referral and liaison visits, structured follow-up by nurses or health professionals, and early programme initiation after discharge).[643–646]	IIa	B
Home-based CR, telehealth, and mHealth interventions may be considered to increase patient participation and long-term adherence to healthy behaviours.[647,648]	IIb	B

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ASCVD = atherosclerotic cardiovascular disease; CR = cardiac rehabilitation; EBCR = exercise-based cardiac rehabilitation; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; mHealth = mobile device-based healthcare.
[a]Class of recommendation.
[b]Level of evidence.

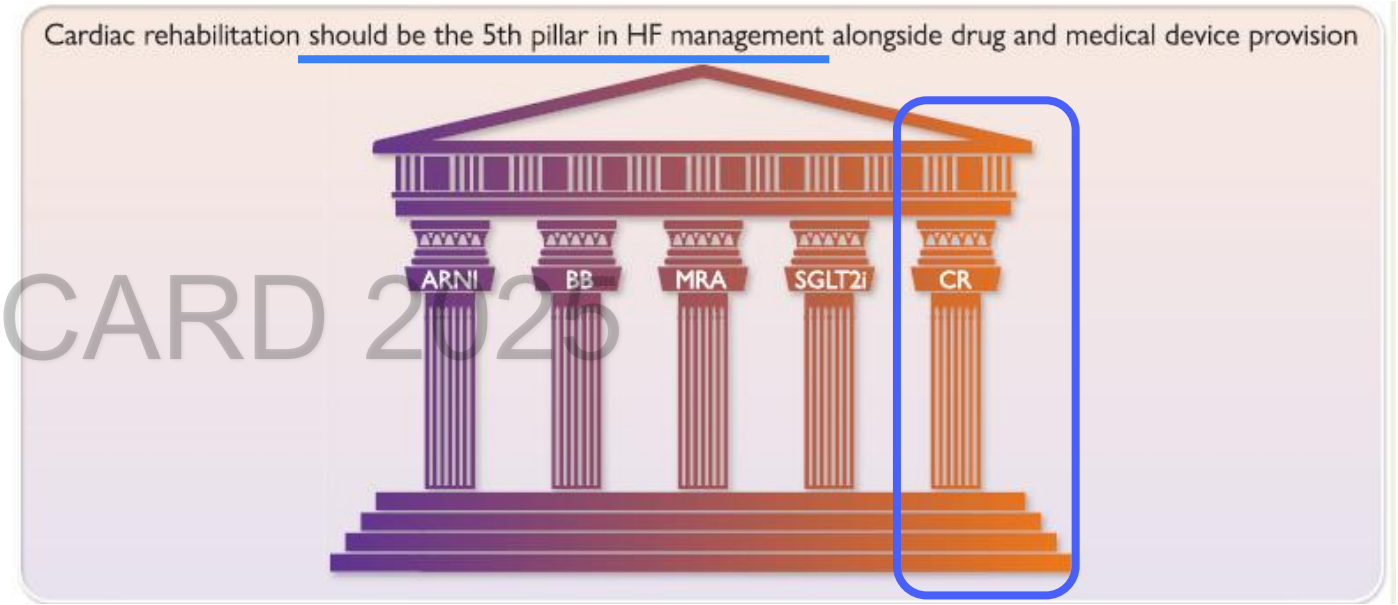
Table 1. Clinical Practice Guideline Recommendations for Center-Based Cardiac Rehabilitation (CR) and Supervised Exercise Training.*

Clinical Practice Guideline	Recommendation	Class of Recommendation (Level of Evidence)†
Center-based CR		
ACC–AHA: coronary-artery revascularization[31]	Among patients who have undergone a revascularization procedure, a comprehensive home- or center-based CR program should be prescribed before hospital discharge or during the first outpatient visit, with the goal of reducing the risks of death and hospital readmission and improving quality of life	I (A)
ACC–AHA: STEMI[30]	Exercise-based CR and secondary prevention programs are recommended for all patients who have had STEMI	I (B)
ACC–AHA: unstable angina or NSTEMI[29]	All eligible patients with an acute coronary syndrome or NSTEMI should be referred to a comprehensive CR program, with the referral made either before hospital discharge or at the first outpatient visit	I (B)
ISHLT: heart transplantation[32]	CR with aerobic exercise training is recommended after heart transplantation; short-term benefits include improvement in exercise capacity and modification of CVD risk factors A total of 150 min of moderate-intensity exercise per week or 75 min of vigorous-intensity aerobic exercise per week is encouraged for long-term cardiovascular health	I (B)
ACC–AHA: chest pain[26]	For patients with obstructive coronary artery disease who have stable chest pain despite GDMT, exercise treadmill testing can be useful for selecting management strategies, including CR	IIa (B)
ACC–AHA: heart failure[27]	In patients with heart failure, a CR program can improve exercise tolerance, functional capacity, and health-related quality of life	IIa (B)
Supervised exercise training		
ACC–AHA: symptomatic peripheral-artery disease[28]	In patients with claudication, a supervised exercise program is recommended to reduce leg symptoms and improve functional status and quality of life	I (A)
ACC–AHA: heart failure[27]	For patients with heart failure, exercise training is recommended to improve functional status, exercise performance, and quality of life	I (A)

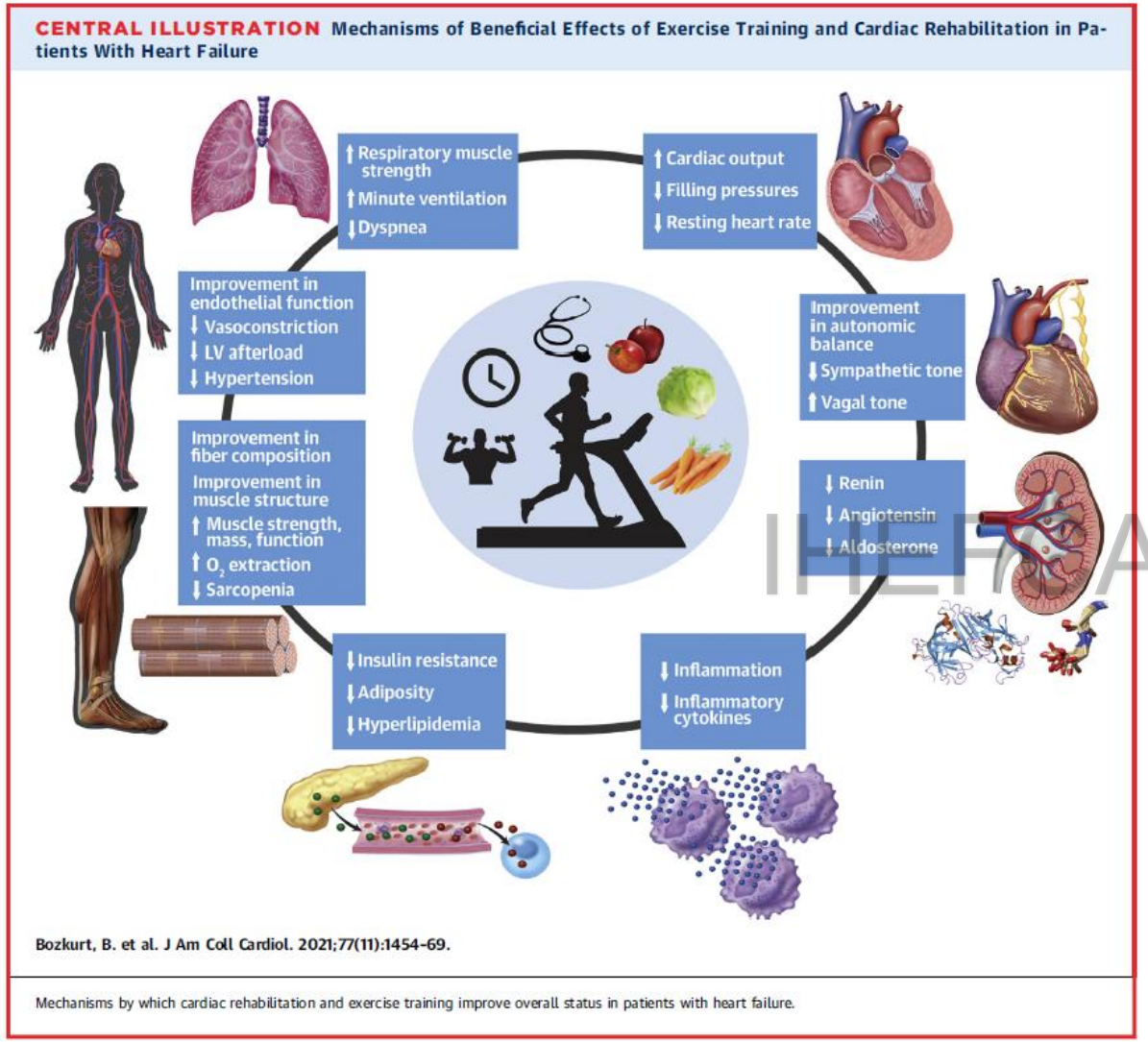
McDonagh, Theresa A., et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) With the special contribution of the Heart Failure Association (HFA) of the ESC. *European heart journal* 42.36 (2021): 3599-3726.
Thomas, Randal J. Cardiac rehabilitation—challenges, advances, and the road ahead. *New England Journal of Medicine* 390.9 (2024): 830-841.

CR Position in HF Management

- International heart failure guidelines strongly **recommend rehabilitation (Class IA) for all chronic heart failure patients, regardless of ejection fraction or use of devices** like cardiac implantable electronic or VADs.[1,2]
- Ambulatory symptomatic (stage C) patients with stable NYHA functional class II or III HF symptoms, on guideline-directed medical therapy, **should be considered for supervised CR.**[3]
- Cardiac rehabilitation stands as **a fundamental pillar of chronic, stable HF**, together with medications and medical devices.[3]



[1]McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J 2021;42:3599–3726.
[2]Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, et al. 2022 AHA/ ACC/HFSA Guideline for the Management of Heart Failure: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation 2022;145:e895–e1032.
[3]Taylor, Rod S., Hasnain M. Dalal, and Ann-Dorthe Zwisler. Cardiac rehabilitation for heart failure: ' Cinderella ' or evidence-based pillar of care?. *European Heart Journal* 44.17 (2023): 1511-1518.



Mechanisms by which cardiac rehabilitation and exercise training improve overall status in patients with heart failure.

Importance of CR in Heart Failure Management

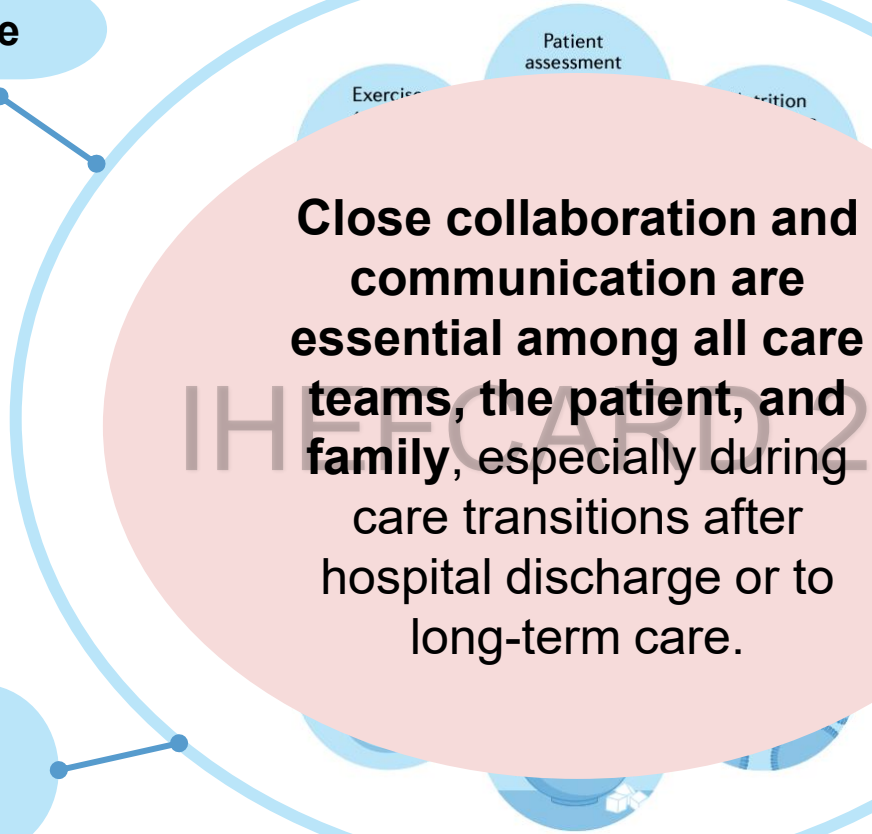
- **Improved Functional Capacity and Exercise Tolerance**
  CR improves VO_2, walking distance, and muscle strength, enhancing physical function.
- **Comprehensive Risk Factor Management and Addresses Multimorbidity**
  Control key CV risk factors, such as blood pressure, cholesterol, weight, and diabetes, while also slowing disease progression through lifestyle support and medical guidance.
- **Enhanced Quality of Life and Psychosocial Well-being**
  By enhancing physical function, reducing symptoms, and supporting emotional well-being.
- **Reduced Mortality and Hospitalizations**
  CR reduces hospital readmissions and heart failure mortality, preventing one readmission for every 12 patients after PCI, and each session is linked to a 1–2% drop in death risk, highlighting the value of early and consistent participation.

Bellmann, B., Lin, T., Greissinger, K., Rottner, L., Rillig, A., & Zimmerling, S. (2020). The beneficial effects of cardiac rehabilitation. Cardiology and therapy, 9(1), 35-44.
Thomas, Randal J. Cardiac rehabilitation—challenges, advances, and the road ahead. *New England Journal of Medicine* 390.9 (2024): 830-841.

Cardiac Rehabilitation: Beyond Exercise, Toward Outcomes

Transition of Care

Patient and Family



Close collaboration and communication are essential among all care teams, the patient, and family, especially during care transitions after hospital discharge or to long-term care.

Heart Failure care team

Cardiac Rehabilitation Team

Component of Cardiac Rehabilitation

Bozkurt, Biykem, et al. Cardiac rehabilitation for patients with heart failure: JACC expert panel. *Journal of the American College of Cardiology* 77.11 (2021): 1454-1469. | Bellmann, B., Lin, T., Greissinger, K., Rottner, L., Rillig, A., & Zimmerling, S. (2020). The beneficial effects of cardiac rehabilitation. *Cardiology and therapy*, *9*(1), 35-44.

Exercise Regimen of CR in HF

Key principle for prescribing the ET program for HF patients:

- **Baseline evaluation** → **CPET** or **6-minute walk test (6MWT)**
- **Individualized Prescription (FITT Principle)** ~ *frequency, intensity, time, and type.*
- **Monitoring progress** → by checking changes in symptoms, NYHA functional class, Quality of Life (QOL), peak VO2 (during CPET), or 6MWT distance
- **Multidisciplinary approach** → collaborative team

TABLE 4 Frequency, Intensity, Time, and Type of Exercise Regimen Commonly Used for Patients With Heart Failure in Cardiac Rehabilitation

	Aerobic Exercise	Resistance Exercise
Frequency	5 days/week, moderate intensity* 3 days/week, high intensity†	2 or 3 nonconsecutive days/week
Intensity	Exercise in target heart rate Focus on a variety of intensities	Determined by the amount of weight lifted and the repetitions and sets Goal of 8-10 exercises, about 1-3 sets of 8-16 repetitions of each exercise
Time	30-60 min/session; shorter if exercise is high intensity	Depends on strength and schedule: up to 1 h for total body workout, less for split-routine workout
Type	Any activity that increases heart rate, such as running, walking, cycling, or dancing	Activities using resistance: bands, dumbbells, machines, body weight exercise

Modified with permission from Josephson and Mehanna (93). *Moderate intensity: 50% to 69% of target heart rate. †High intensity: 70% to <90% of target heart rate.

- **Exercise modalities** → aerobic/endurance, resistance training, High-intensity interval training (HIIT), inspiratory muscle training, and localized muscle training

Bozkurt, Biykem, et al. Cardiac rehabilitation for patients with heart failure: JACC expert panel. *Journal of the American College of Cardiology* 77.11 (2021): 1454-1469.

The 5th Indonesian Symposium on Heart Failure and Cardiometabolic Disease

The Power of CR in HF: Updated Evidence

Exercise Training in Heart Failure: HF-ACTION TRIAL

HF-ACTION
Heart Failure: A Controlled Trial

Exercise training should be considered for medically stable outpatients with heart failure, according to guidelines. The statistical power of earlier research to assess the impact of exercise training on clinical outcomes was *insufficient*.

Objectives: to evaluate the safety and effectiveness of **exercise training for heart failure patients**.

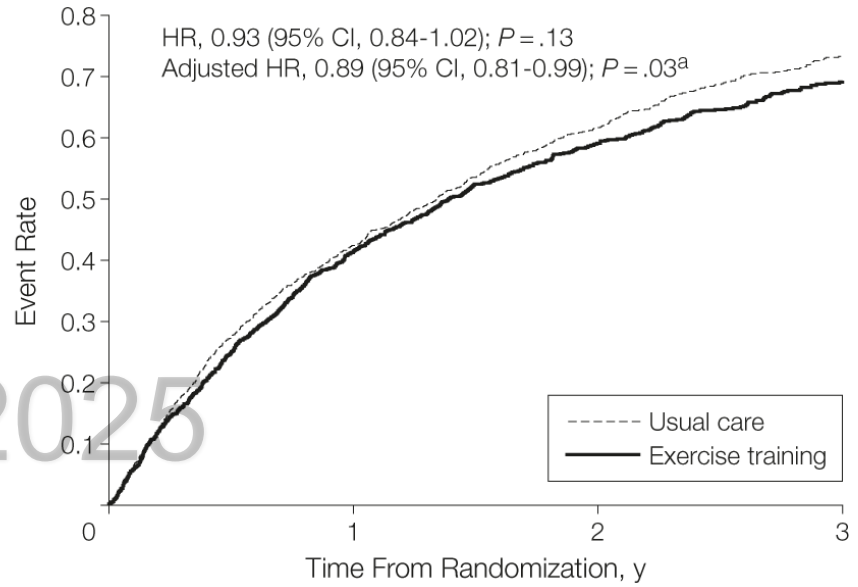
Methods :

2331 medically stable outpatients with Heart Failure and reduced EF

Interventions:

- **Usual Care Only**
- **Usual Care + Aerobic Exercise Training**

All-Cause Mortality or All-Cause Hospitalization



No. at risk				
Usual care	1172	651	337	146
Exercise training	1159	656	352	167

- After **adjusting for highly prognostic** baseline characteristics, exercise training was found to **reduce the incidence of all-cause mortality or all-cause hospitalization (the primary endpoint) by 11%** (HR, 0.89 [95% CI, 0.81-0.99]; P = .03)
- Both **cardiovascular mortality or heart failure hospitalization** and **all-cause mortality or hospitalization** were also shown to be relatively **significantly reduced by exercise training**, even after controlling for highly predictive indicators of the primary end outcome.

O'Connor, C. M., et al. (2009). Efficacy and safety of exercise training in patients with chronic heart failure: HF-ACTION randomized controlled trial. JAMA, 301(14), 1439-1450.

Exercise Training in Heart Failure: HF-ACTION TRIAL

HF-ACTION
Heart Failure: A Controlled Trial

- **The changes in cardiopulmonary exercise testing parameters and distance in the 6-minute walk test** at 3 months were **consistent** **with the finding of a modest benefit in reducing clinical events**.
- The result also showed **improved cardiovascular fitness at 12 months**, despite no significant difference in the 6MWT.
- The study reported **some challenges** related to issues of crossover, adherence, and site variation.

Table 4. Change in 6-Minute Walk Test and Cardiopulmonary Exercise Test Results

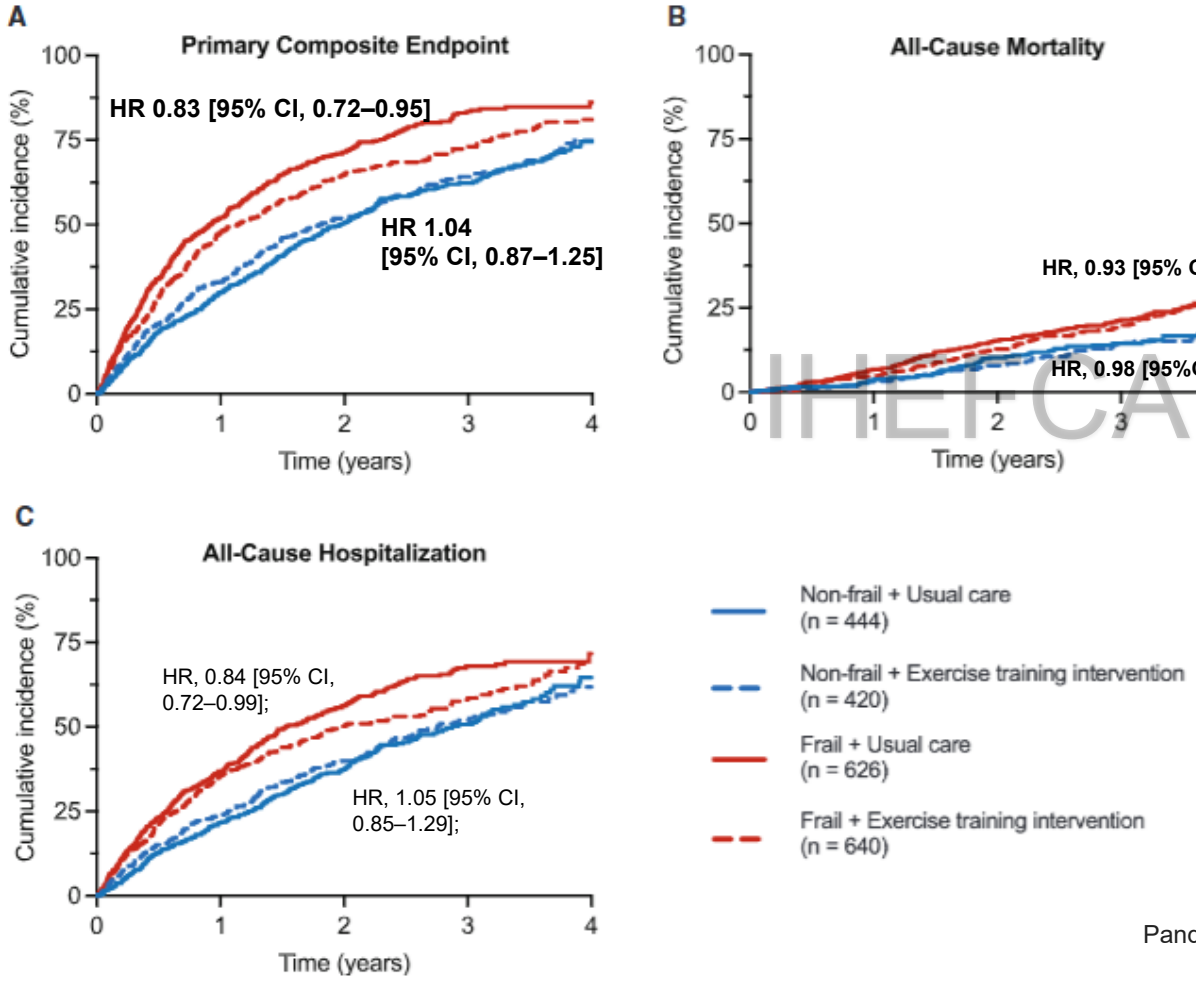
	Median (IQR)		
	Usual Care	Exercise Training	*P* Value
Baseline to 3 mo[a]			
Distance of 6-minute walk, m (n = 1835)	5 (–28 to 37)	20 (–15 to 57)	<.001
Cardiopulmonary exercise time, min (n = 1914)	0.3 (–0.6 to 1.4)	1.5 (0.3 to 3.0)	<.001
Peak oxygen consumption, mL/kg/min (n = 1870)	0.2 (–1.2 to 1.4)	0.6 (–0.7 to 2.3)	<.001
Baseline to 12 mo[b]			
Distance of 6-minute walk, m (n = 1444)	12 (–30 to 55)	13 (–28 to 61)	.26
Cardiopulmonary exercise time, min (n = 1476)	0.2 (–1.0 to 1.7)	1.5 (0 to 3.2)	<.001
Peak oxygen consumption, mL/kg/min (n = 1442)	0.1 (–1.5 to 1.8)	0.7 (–1.0 to 2.5)	<.001

Abbreviation: IQR, interquartile range.
[a]Complete case analysis. Expected 2284 patients at 3 months.
[b]Complete case analysis. Expected 2159 patients at 12 months.

O'Connor, C. M., et al. (2009). Efficacy and safety of exercise training in patients with chronic heart failure: HF-ACTION randomized controlled trial. JAMA, 301(14), 1439-1450.

Recent Analysis from HF-ACTION

Aerobic exercise notably decreased hospitalization risk, primarily in frail individuals.



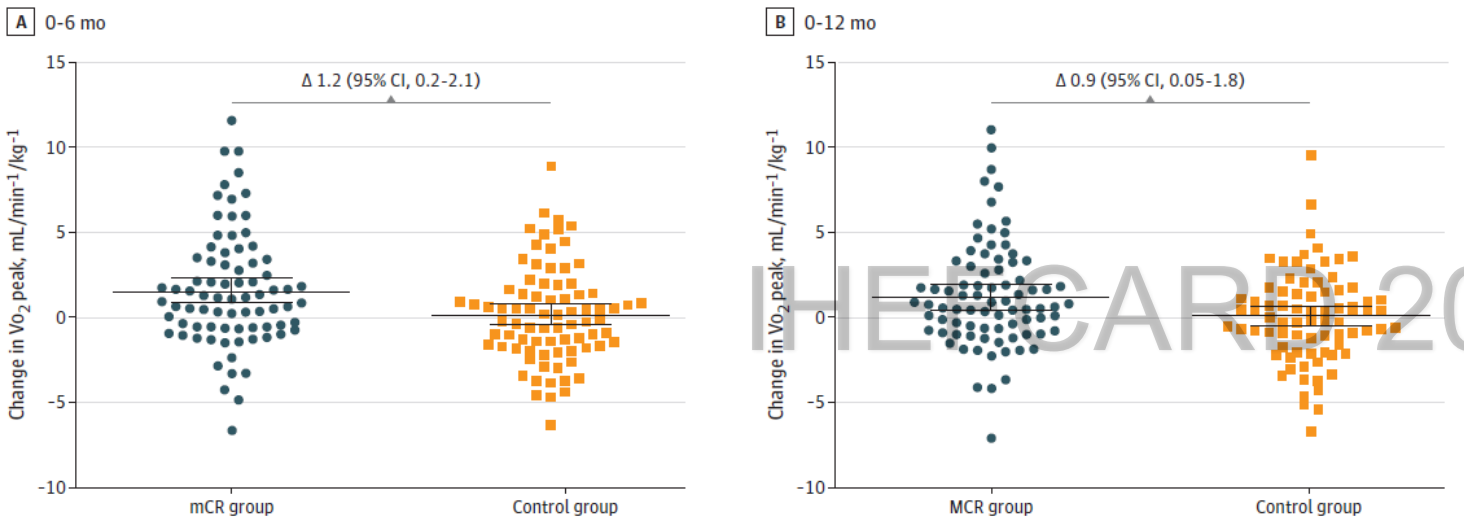
- Aerobic ET was associated with a **significantly lower risk of the primary composite endpoint and all-cause hospitalization among frail but** non-frail participants.
- But **no significant reduction** in risk of all-cause mortality with aerobic ET among frail and non-frail participants

- **Aerobic exercise training did not increase the risk of adverse events,** such as **worsening HF** or **hospitalization**, in both **frail and non-frail** participants → **SAFE**

Pandey, A. et al. 2022. Frailty status modifies the efficacy of exercise training among patients with chronic heart failure and reduced ejection fraction: an analysis from the HF-ACTION trial. *Circulation*, *146*(2), 80-90.

Benefits of CR for Elderly population

Figure 2. Primary Outcome of Change in Peak Oxygen Uptake (Vo_2peak) at 6 and 12 Months of Follow-up



Change in Vo_2peak from baseline to 6 and 12 months follow-up is significantly greater in the mobile cardiac rehabilitation (MCR) intervention group compared with the control group. Data are presented as mean (95% CI). The difference between groups with 95% CI is displayed at the top.

Changes in VO_2peak were greater in the mobile cardiac rehabilitation (MCR) vs control groups at **6 months** (+1.2 [95%CI, 0.2 to 2.1] mL/kg−1/min−1) **and 12 months** (+0.9 [95%CI, 0.05 to 1.8] mL/kg−1/min−1).

According to an international, multicenter, randomized clinical trial conducted by Snoek et al. (2024), which included 179 patients, six months of **home-based mobile cardiac rehabilitation (HBCR)** was linked to:

- **a more significant improvement in physical fitness** compared to no cardiac rehabilitation was sustained at the one-year follow-up, and
- **the incidence of adverse events was low** and comparable between the intervention and control groups.

Snoek, Johan A., et al. Effectiveness of home-based mobile guided cardiac rehabilitation as alternative strategy for nonparticipation in clinic-based cardiac rehabilitation among elderly patients in Europe: a randomized clinical trial. *JAMA cardiology* 6.4 (2021): 463-468.

How to deliver cardiac rehabilitation in heart failure?

Generally, CR has been delivered **in traditional center-based programs**, but **new models are emerging** to address barriers to access and participation.

Type of CR delivery models:

Center-Based Cardiac Rehabilitation (CBCR):

Involves up to 36 supervised, in-person sessions over 12 weeks at a hospital outpatient area or a community-based facility

Home-Based Cardiac Rehabilitation (HBCR):

Offers the same care as center-based rehab, with support delivered remotely through calls, video, or messages—live or later.

Hybrid Programs

Combining both center-based and home-based CR

Digitally Supported/Virtual/Remote CR:

Utilizing various technologies to deliver CR services outside a traditional center, allowing for remote monitoring and coaching

Table 1. Potential Advantages and Disadvantages of HBCR Compared With CBCR

Potential Advantages	Potential Disadvantages
Reduced enrollment delays	Lack of reimbursement
Expanded capacity/access	Less intensive exercise training
Individually tailored programs	Less social support
Flexible, convenient scheduling	Less patient accountability
Minimal travel/transportation barriers	Lack of published standards for HBCR
Greater privacy while receiving CR services	Less face-to-face monitoring and communication
Integration with regular home routine	Safety concerns for patients at higher risk

CBCR indicates center-based cardiac rehabilitation; CR, cardiac rehabilitation; and HBCR, home-based cardiac rehabilitation

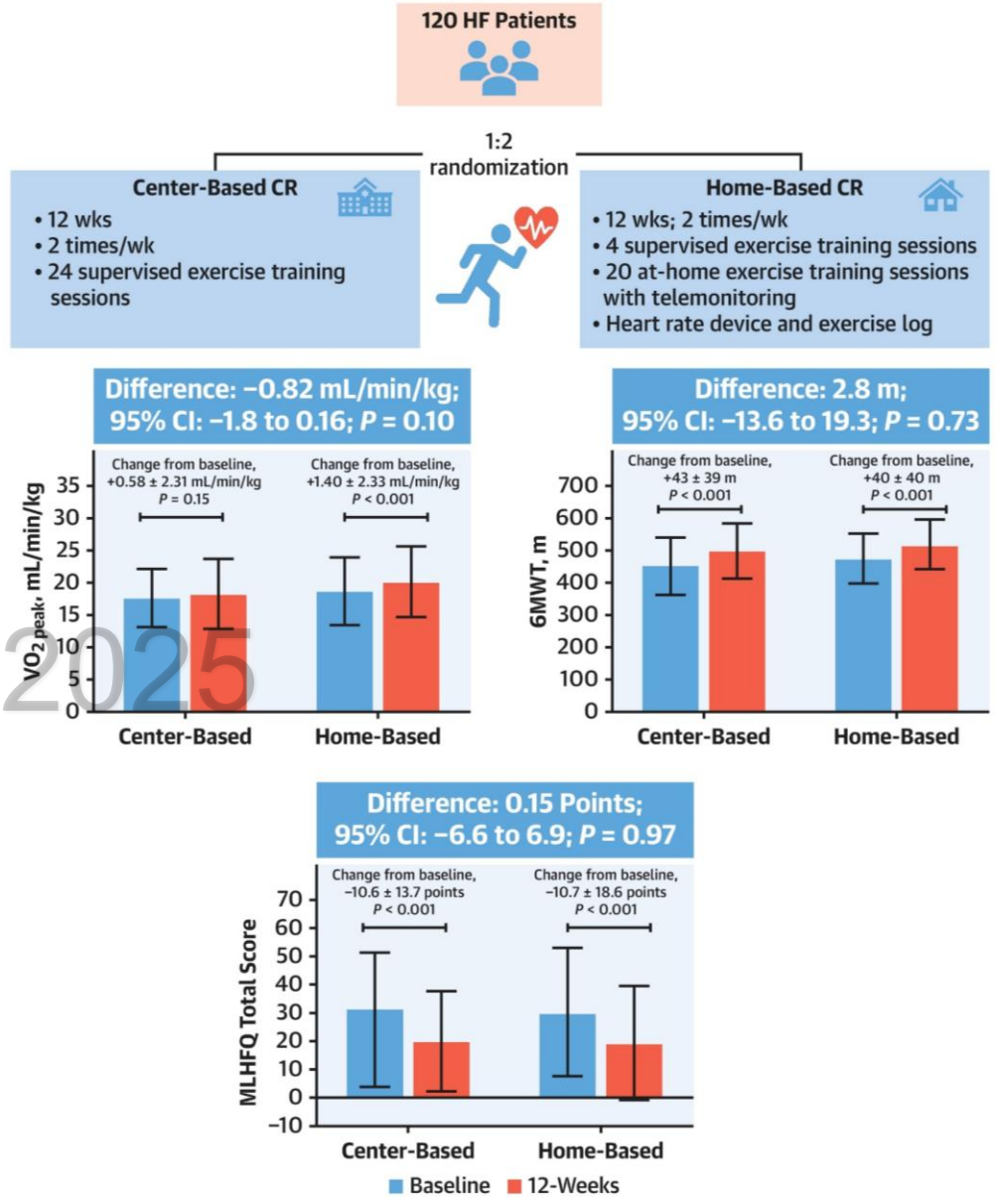
Both home- and center-based rehab have **pros and cons**. Care should be **tailored to each patient's condition and needs**.

Beatty, A. L., Beckie, T. M., Dodson, J., Goldstein, C. M., Hughes, J. W., Kraus, W. E., ... & Franklin, B. A. (2023). A new era in cardiac rehabilitation delivery: research gaps, questions, strategies, and priorities. *Circulation*, *147*(3), 254-266. |
Thomas, R.J., et al. 2019. Home-based cardiac rehabilitation: a scientific statement from the American Association of Cardiovascular and Pulmonary Rehabilitation, the American Heart Association, and the American College of Cardiology. Circulation, 140(1), e69-e89.

Center-based CR vs Home-based CR in HF population:
EXIT-HF Trial

A recent trial comparing CBCR vs. HBCR reveals that:

- **HBCR is as effective as CBCR**, showing similar improvements in exercise capacity (Vo_2peak) and health outcomes.
- **Noninferior performance** confirms HBCR as a valid option, especially for those unable to attend center-based rehab.
- **Adherence was comparable** in both groups (HBCR 84%, CBCR 81%).
- **HBCR proved flexible and feasible**, using remote monitoring and fewer supervised sessions.
- Supports **patient-centered care by** offering a tailored, accessible alternative to traditional rehabilitation services.



Schmidt C, et al. JACC Heart Fail. 2025;13(5):695-706.

Schmidt, Cristine, et al. Center-vs home-based cardiac rehabilitation in patients with heart failure: EXIT-HF randomized controlled trial. *Heart Failure* 13.5 (2025): 695-706.

The Use of Technology in CR Delivery

Utilizing technology in CR delivery can provide a flexible, patient-centered hybrid program that offers both in-person and virtual/remote options.

Synchronous Model

Virtual model to monitor patient exercise and deliver instruction in **real-time,** such as consultation

Asynchronous Model

An asynchronous remote model may also be made available through **wearable and smartphone-based technology** to monitor workouts and provide patient education**.**

Both models are essential in expanding CR access, especially for patients facing barriers like geographic distance or time constraints.

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Implementation Barrier

- CR implementation remains extremely limited

Barriers		Impacts
Patient-level Barrier	**Low patient awareness or willingness**	Patients may not fully understand the benefits or face barriers such as transportation, distance, time constraints, or lack of social support.
Healthcare Professional Barriers	**Low clinician referral rate**	Low referral of CR for HF patients due to limited time or lack of awareness of efficacy.
	Workforce shortage	Trained multidisciplinary teams (physio, dietitians, psychologists) are lacking in many settings.
System-level Barriers	**Lack of infrastructure**	An international survey found CR programs are available in just 54.7% of countries, with major access gaps in low- and middle-income regions.
	No national tracking/audit of CR outcomes	Without visible data, policymakers and funders can't prioritize expansion.

Although cardiac rehabilitation is officially covered by Indonesia's national health insurance, real-world uptake ***remains low due to limited infrastructure, referral systems, and implementation support***. Thus, highlighting the need not just for coverage, but for **operational innovation and delivery reform.**

Taylor, Rod S., Hasnain M. Dalal, and Ann-Dorthe Zwisler. Cardiac rehabilitation for heart failure: ' Cinderella ' or evidence-based pillar of care?. *European Heart Journal* 44.17 (2023): 1511-1518. | Shanmugasegaram, S., Oh, P., Reid, R. D., McCumber, T., & Grace, S. L. (2013). Cardiac rehabilitation barriers by rurality and socioeconomic status: a cross-sectional study. *International journal for equity in health*, *12*, 1-8. | Sadeghi, M., Alavi, M., Mohammadi, M., Roohafza, H., Mahmoodi, A., Visentin, D., ... & Cleary, M. (2019). Perceptions of illness as predictive factors for perceived stress in patients participating in a cardiac rehabilitation program. *Nursing & health sciences*, *21*(4), 508-514. | Turk-Adawi, K., Supervia, M., Lopez-Jimenez, F., Pesah, E., Ding, R., Britto, R. R., ... & Grace, S. L. (2019). Cardiac rehabilitation availability and density around the globe. *EClinicalMedicine*, *13*, 31-45.

Upcoming Innovations

Expanding Eligibility	Future efforts aim to extend CR to patients with emerging indications, such as **HFpEF** or heart failure with mid-range ejection fraction (**HFmrEF**), where current evidence gaps exist
Long-Term Engagement	A high priority is to deliver longer-term, high-quality CR services to all eligible patients
Technological Advancements	Advances in wearables, monitors, and AI support personalized remote CR, enhancing adherence and outcomes.
Collaboration	Advancing CR globally requires clear telehealth training for providers and stronger interdisciplinary collaboration
Targeted Research	Future research should focus on making CR more inclusive, equitable, and personalized through diverse participation, virtual models, and culturally adapted approaches.

Ullah, A., Kumar, M., Sayyar, M., Sapna, F. N. U., John, C., Memon, S., ... & Mohamad, T. (2023). Revolutionizing cardiac care: a comprehensive narrative review of cardiac rehabilitation and the evolution of cardiovascular medicine. *Cureus*, *15*(10).

Key takeaways

- **Comprehensive Care in CR** consists of exercise, nutrition, mental health support, education, and risk factor management.
- **The proven benefits of CR in HF** include improving function, quality of life (QOL), and reducing hospitalizations and mortality; it also helps patients with multimorbidity.
- **Major gaps in CR implementation in HF management are due to** barriers such as cost, transportation, awareness, and access.
- **Innovative approaches**, such as Home-based, virtual, and hybrid CR, can enhance access, but require further research to establish broad safety and effectiveness.
- ***Urgent Action Needed!*** Stakeholders should advocate for improved facilities, referrals, and coverage to narrow the CR participation gap.


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