CIBE
CENTRO ITALIANO DI BIOSTATISTICA ED EPIDEMIOLOGIA

ROMA,CNR-AULA A
(p.terra,c/o Biblioteca Centrale)

3 Ottobre 2023

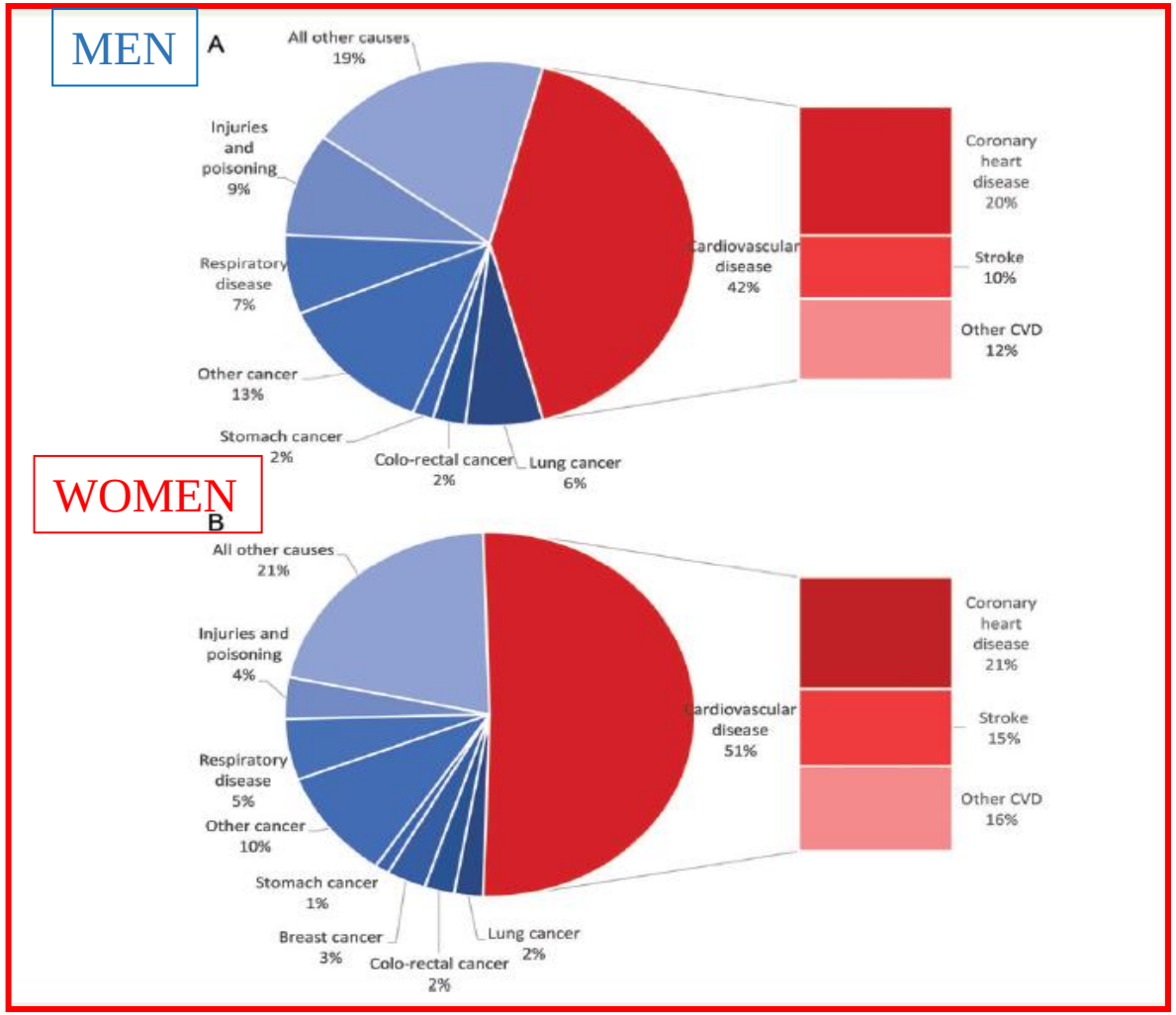
Cardiopatia ischemica: fattori di rischio e differenze di genere (sesso) tra la III e la IV età

Federica Moscucci, MD, PhD
Azienda Ospedaliero Universitaria Policlinico Umberto I
Roma

Susanna Sciomer, MD, FESC
Dipartimento di Scienze Cliniche, Internistiche, Anestesiologiche e Cardiovascolari
Università "Sapienza", Roma

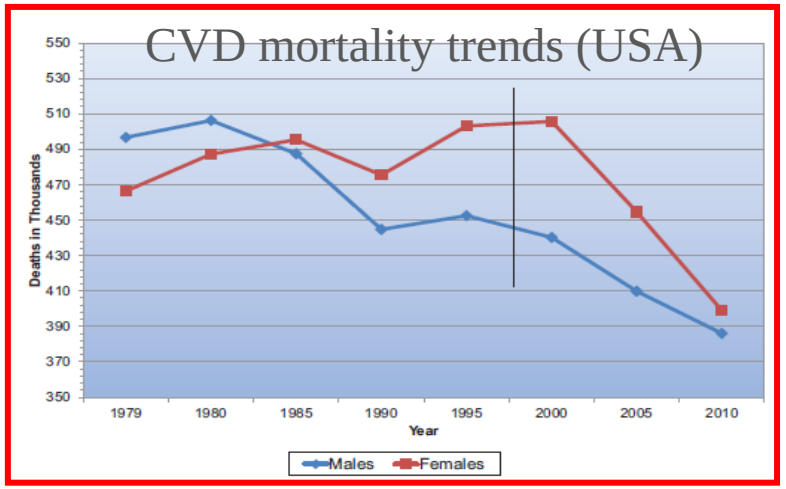
Cardiovascular disease in Europe 2019: epidemiological update

Proportion of all deaths due to major causes in Europe



Women and coronary heart disease:
a century after Herrick:
understudied, underdiagnosed, and undertreated

Herrick's prototype patient was a man past the middle period of life.



NK Wenger:Circulation 2012;126:604-611

TS Luscher: Epidemiology of cardiovascular disease: the new ESC Atlas and beyond. EHJ 2018

Cardiovascular disease: the leading cause of death *and disability* in women

Women have a notable increase in the risk for Cardiovascular Disease after menopause and typically develop Coronary Heart Disease several years later than men

Hypothesis

Menopause transition contributes to the increase in Coronary Heart Disease Risk

Menopause: the permanent cessation of ovarian reproductive function

Menopause Transition

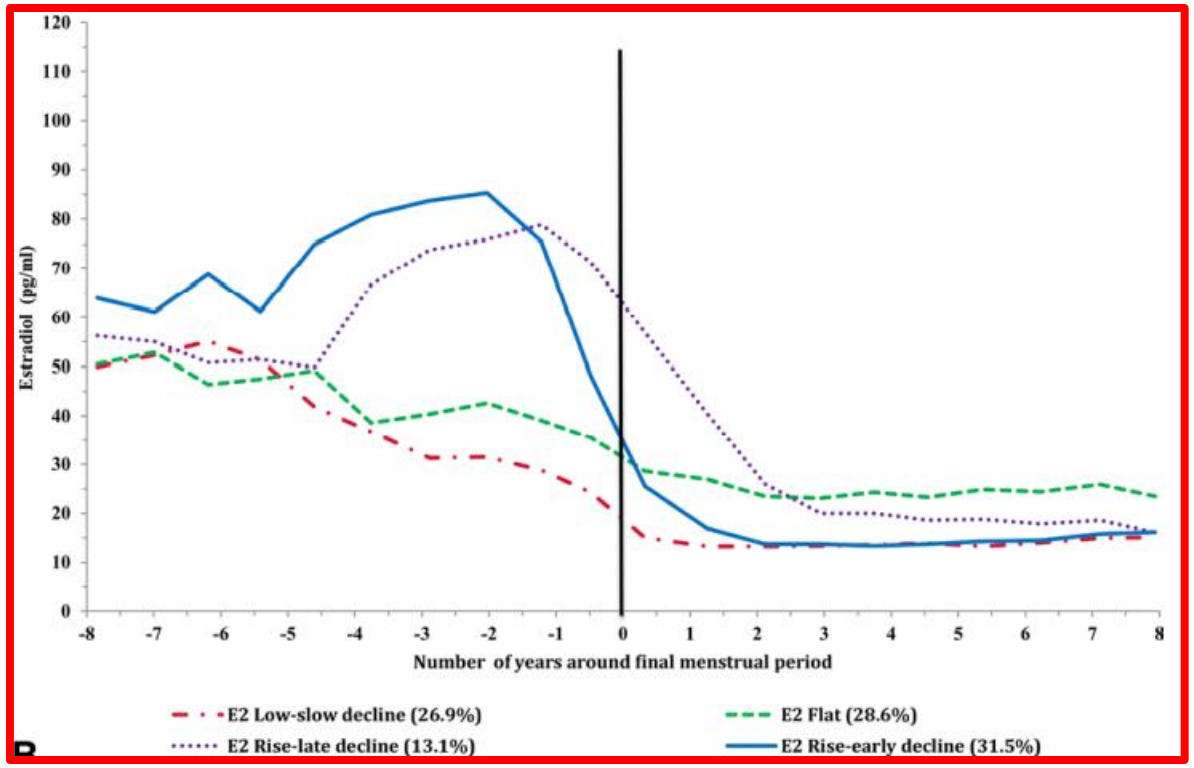
The transition from any level of function, manifested by uterine menstruation, to the absence of menses.

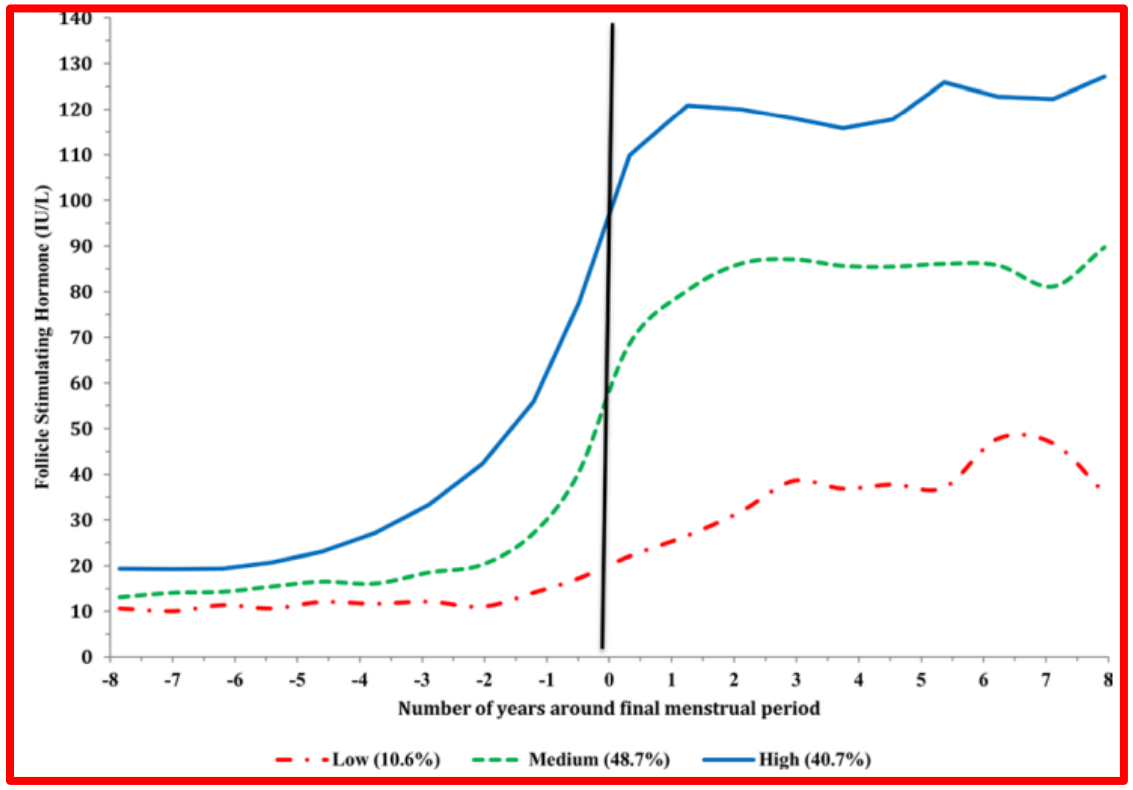
MT is characterized as the time when the menstrual cycles become significantly variable or other menopause-related symptoms begin

El Khoudary SR et Al.Circulation. 2020;142:e506–e532

Cardiovascular Implications of the Menopause Transition

Distinct patterns of sex hormone changes





El Khoudary SR, Thurston RC. Cardiovascular implications of the menopause transition: endogenous sex hormones and vasomotor symptoms. Obstet Gynecol Clin North Am 2018; 45: 641 - 661

Circulation. 2020;142:e506–e532

Circulation

AHA SCIENTIFIC STATEMENT

Menopause Transition and Cardiovascular Disease Risk: Implications for Timing of Early Prevention

A Scientific Statement From the American Heart Association

Distinct patterns of sex hormone changes

Adverse alterations in:

Body composition

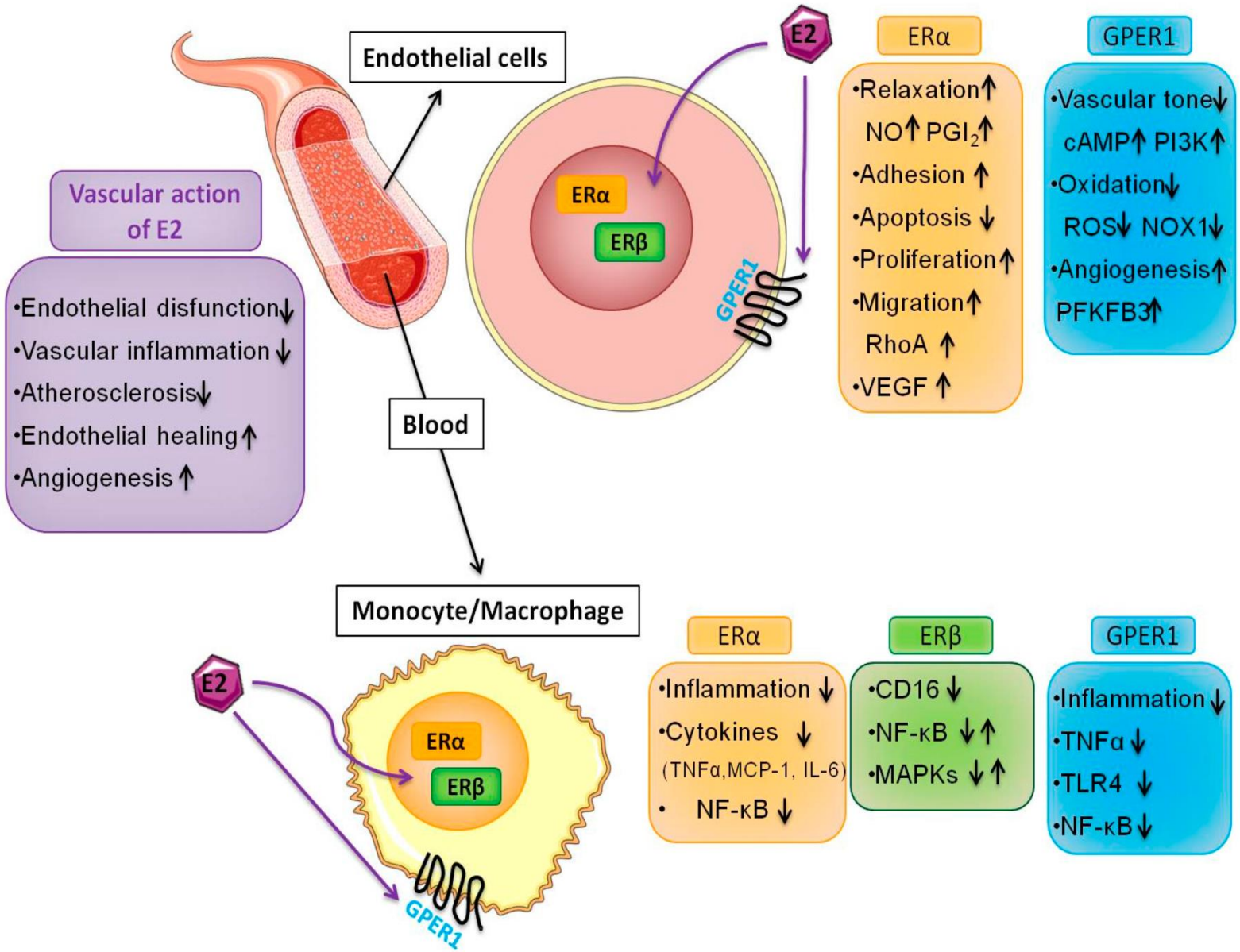
Lipids and lipoproteins

Measures of vascular health over the Menopause Transition

⇩

Increase a woman's risk of developing CVD postmenopausally

SR. El Khoudary, B Aggarwal, TM Beckie,HN Hodis, A E Johnson, R D Langer, M C Limacher, JoAnn E Manson, ML Stefanick, MA Allison, on behalf of the American Heart Association Prevention Science Committee of the Council on Epidemiology and Prevention


Endothelial cells
E2
ERα
ERβ
GPER1
Vascular action of E2
•Endothelial disfunction↓
•Vascular inflammation ↓
•Atherosclerosis↓
•Endothelial healing↑
•Angiogenesis ↑
Blood
ERα
•Relaxation↑
NO↑ PGI2↑
•Adhesion ↑
•Apoptosis ↓
•Proliferation↑
•Migration↑
RhoA ↑
•VEGF ↑
GPER1
•Vascular tone↓
cAMP↑ PI3K↑
•Oxidation↓
ROS↓ NOX1↓
•Angiogenesis↑
PFKFB3↑
Monocyte/Macrophage
E2
ERα
ERβ
GPER1
ERα
•Inflammation ↓
•Cytokines ↓
(TNFα,MCP-1, IL-6)
• NF-κB ↓
ERβ
•CD16 ↓
•NF-κB ↓↑
•MAPKs ↓↑
GPER1
•Inflammation ↓
•TNFα ↓
•TLR4 ↓
•NF-κB ↓

Cardiovascular Risk: role of sex hormons (estrogens)

- Weight gain
- Insulin resistance
- Adrenergic tone
- Oxidative stress
- NO levels
- RAA system
- Blood pressure
- Change in hemostatic balance
- Change in lipid profile

↓ **Vasoconstrinctor Substances**
Pro-atherosclerotic factors (endotelin, omocistein, RAA system, catecolamines, LDL)
Growth factors

↑ **Vasodilator Substances** (NO, Prostacycline, cAMP, Adenosine)

Estrogen-mediated genomic effects (inhibit of smooth muscle proliferation and collagen and elastin deposition)

Estrogen maintains normal endothelial function through stimulation of nitric oxide production, induces structural and functional alterations in the arterial wall that reduce vascular stiffness and reduces sympathetic nervous system activity

Androgens increase blood pressure through stimulation of the RAS, ovarian hormones have the opposite effect by reducing plasma renin and ACE activity

→ Protective Effect on Cardiovascular System

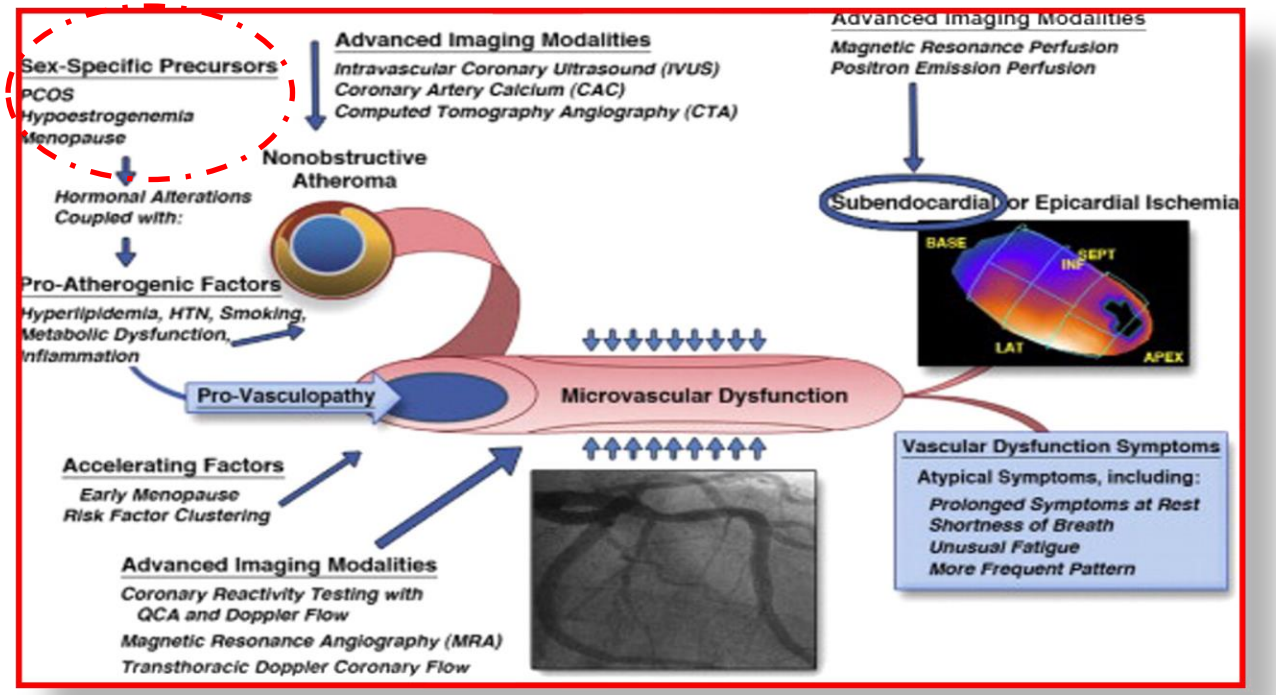
Female sex hormones may also protect against salt-induced increases in blood pressure; indeed, the prevalence of salt sensitivity increased from 22.5% to 52.5% after ovariectomy

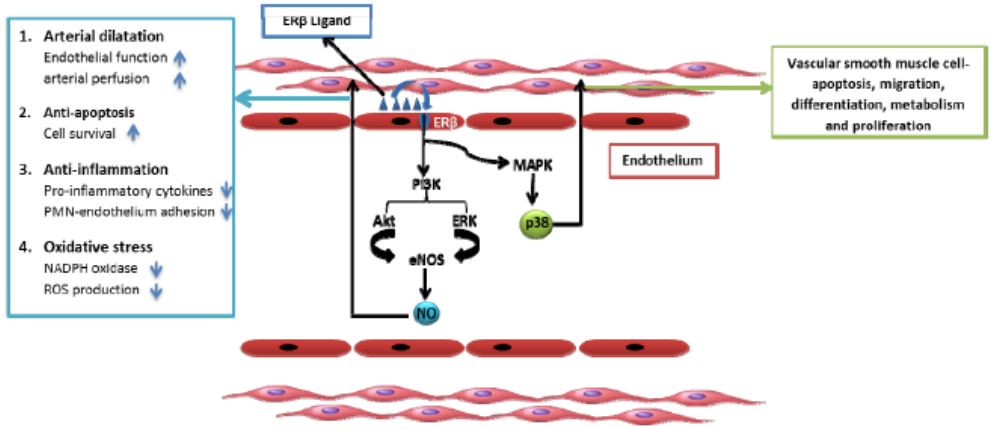
Schulman IH et al: *Hypertension.* 2006

Dubey RK, Hypertension, 2004

Endothelial Dysfunction

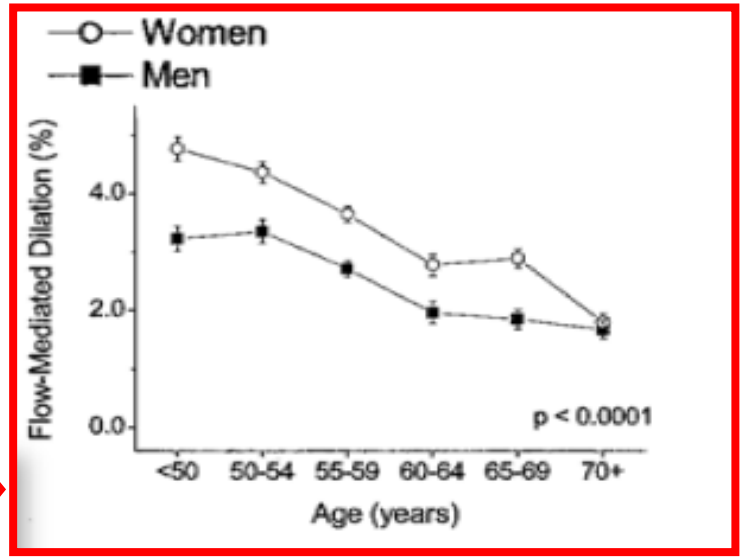
Microvascular Coronary Disease





Women have better endothelial function than men

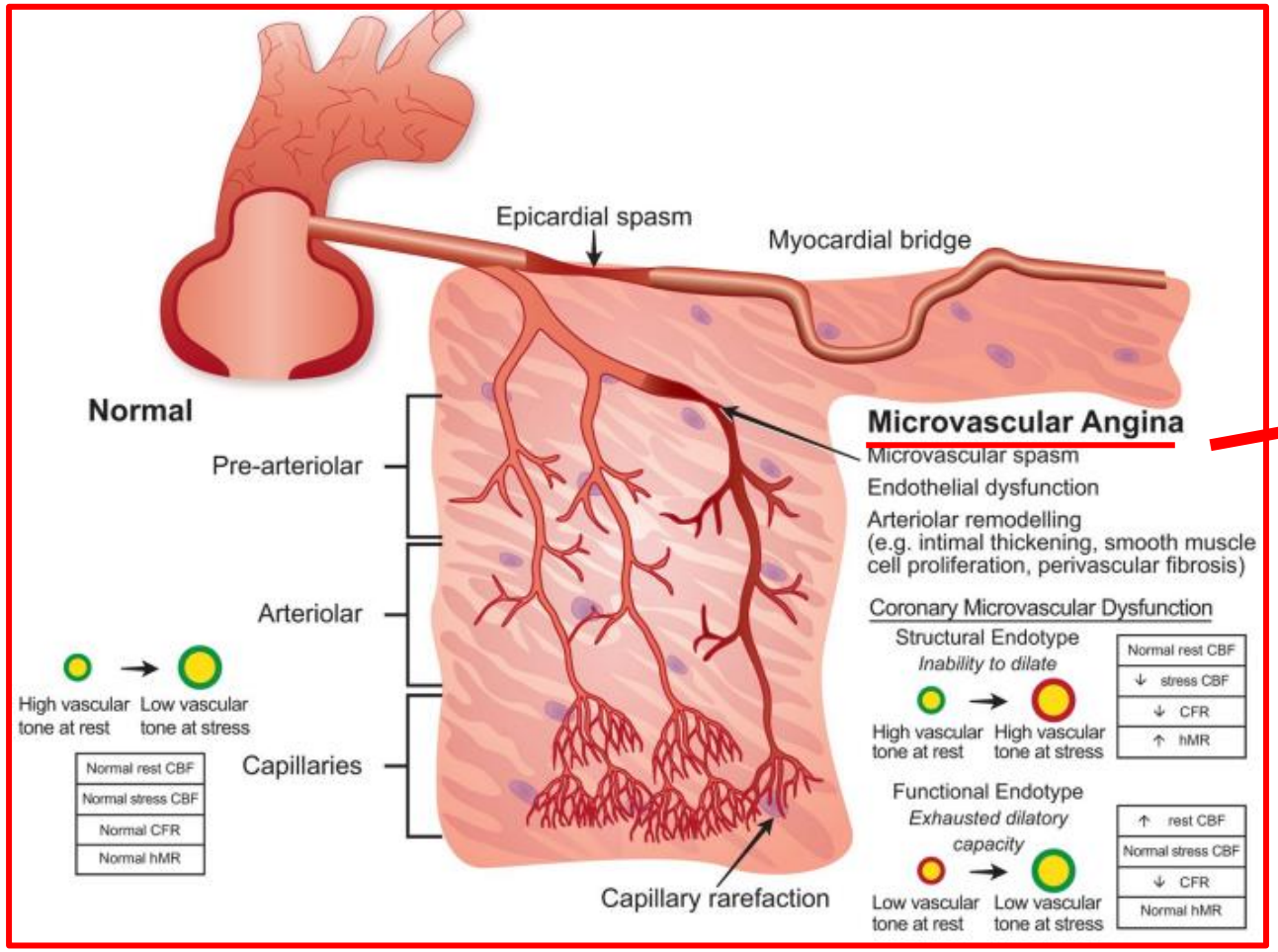
Advantage declines with age

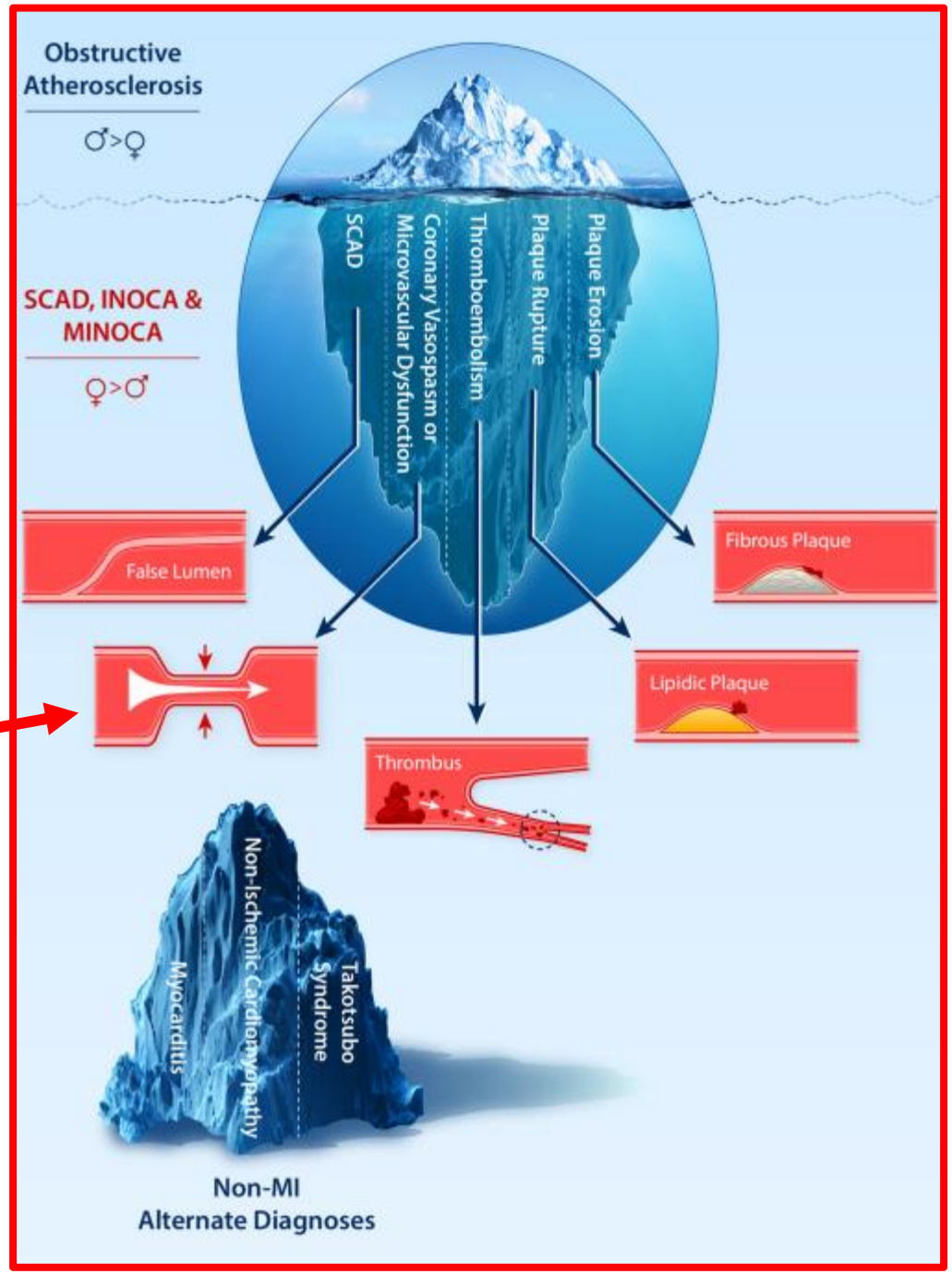


Xing, D. et al. Arterioscler Thromb Vasc Biol 2009;29:289-295

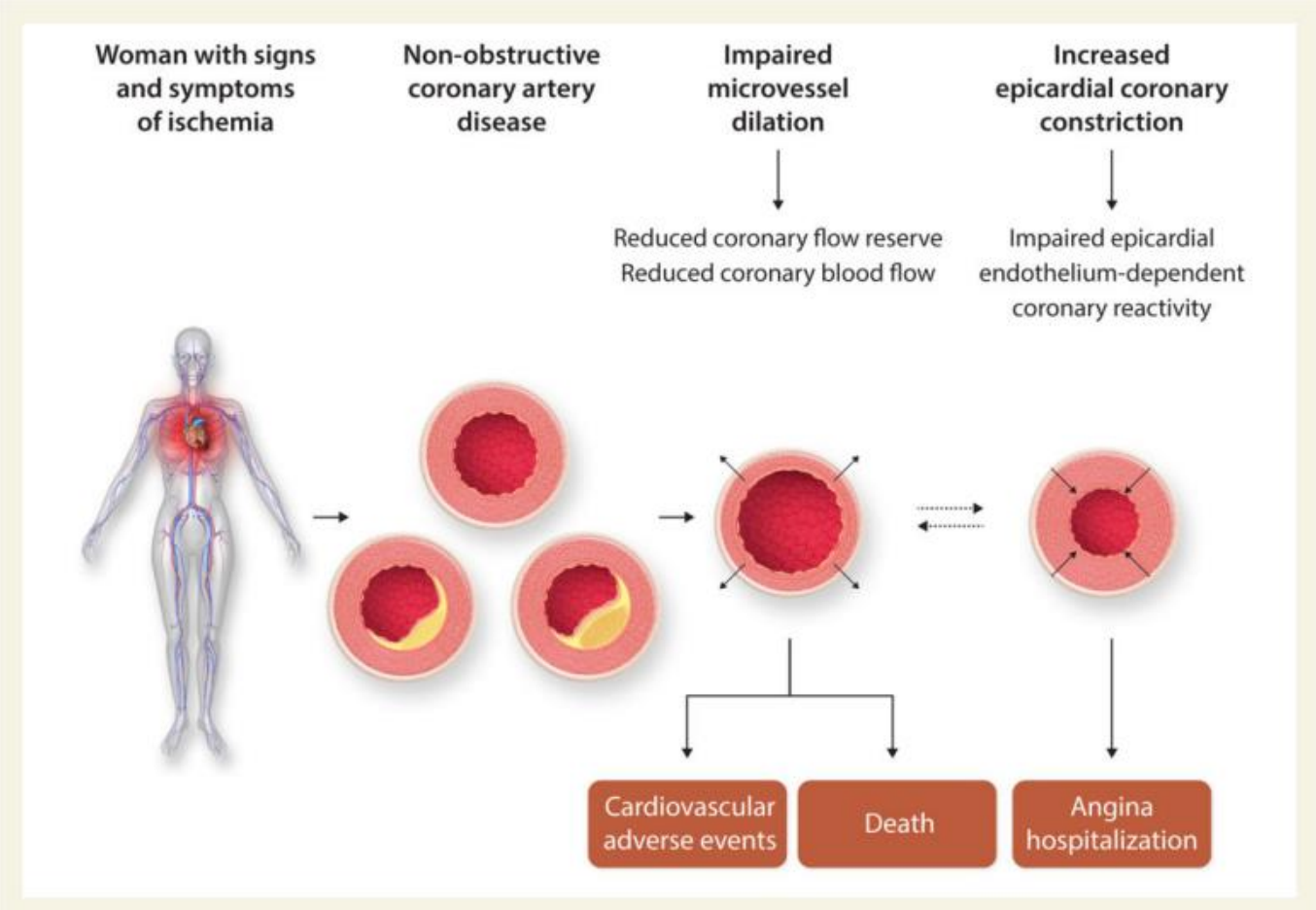
Benjamin EJ et al., Circulation 2004

Pathogenesis of Myocardial Infarction and Ischemia in Women





Reynolds HR et Al: Circulation Research 2022



ESC European Society of Cardiology
Cardiovascular Research (2020) 116, 856–870
doi:10.1093/cvr/cvaa006
SPOTLIGHT REVIEW

Treatment of coronary microvascular dysfunction

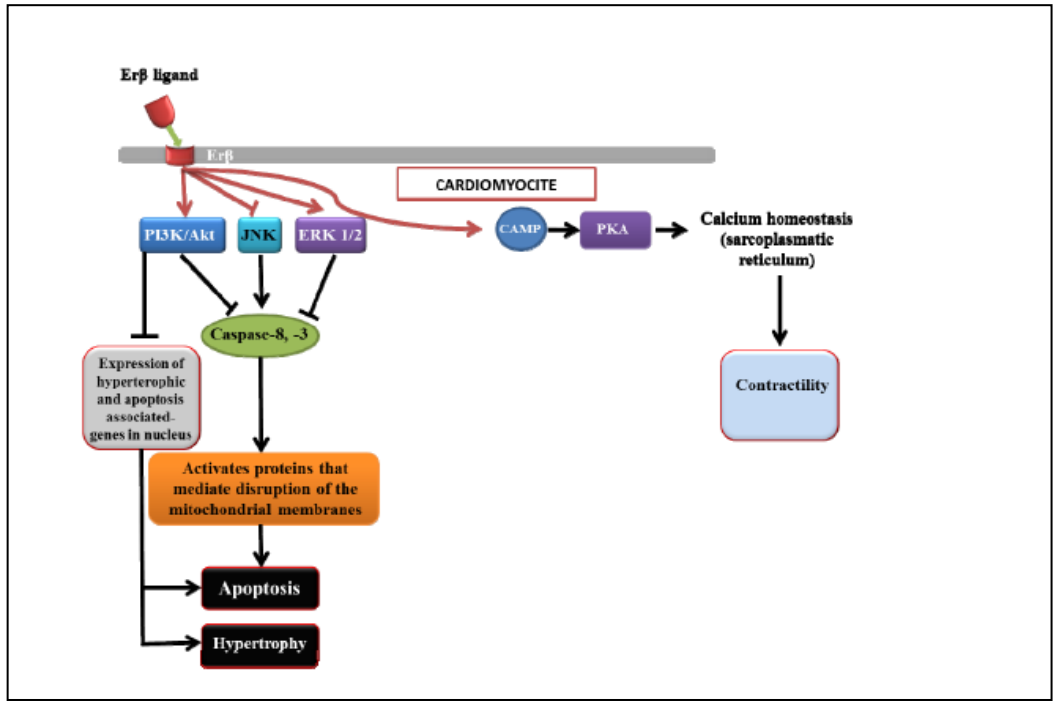
C. Noel Bairey Merz[1]*, Carl J. Pepine[2], Hiroki Shimokawa[3], and Colin Berry[4]

Approximately 30–50% of women who undergo coronary angiography for evaluation of chest pain do not have obstructive CAD

Once thought to be a benign condition, CMD has been found to have a 2.5% annual rate of major adverse cardiovascular events (MACE) including stroke, heart failure or MI.

Shufelt et Al:Sex-specific physiology and cardiovascular disease. Adv Exp Med Biol 2018.

Jespersen L, et Al: Stable angina pectoris with no obstructive coronary artery disease is associated with increased risks of major adverse cardiovascular events. Eur Heart J 2012, 33(6).



Menopause Symptoms and Signs and CVD risk

Vasomotor symptoms are associated with worse CVD risk factor levels

Sleep disturbance

Central/visceral fat increases

Paracardial fat volumes are higher after menopause, independently of age, and could be influenced by estradiol levels or MHT

Increases in lipids (LDL-C and apolipoprotein B), metabolic syndrome risk, and vascular remodeling at midlife are driven by the MT more than aging, whereas increases in blood pressure, insulin, and glucose are likely more influenced by chronological aging

CLIMACTERIC, 2017

Who deserves our attention?

Vasomotor symptoms in menopause: a biomarker of cardiovascular disease risk and other chronic diseases?

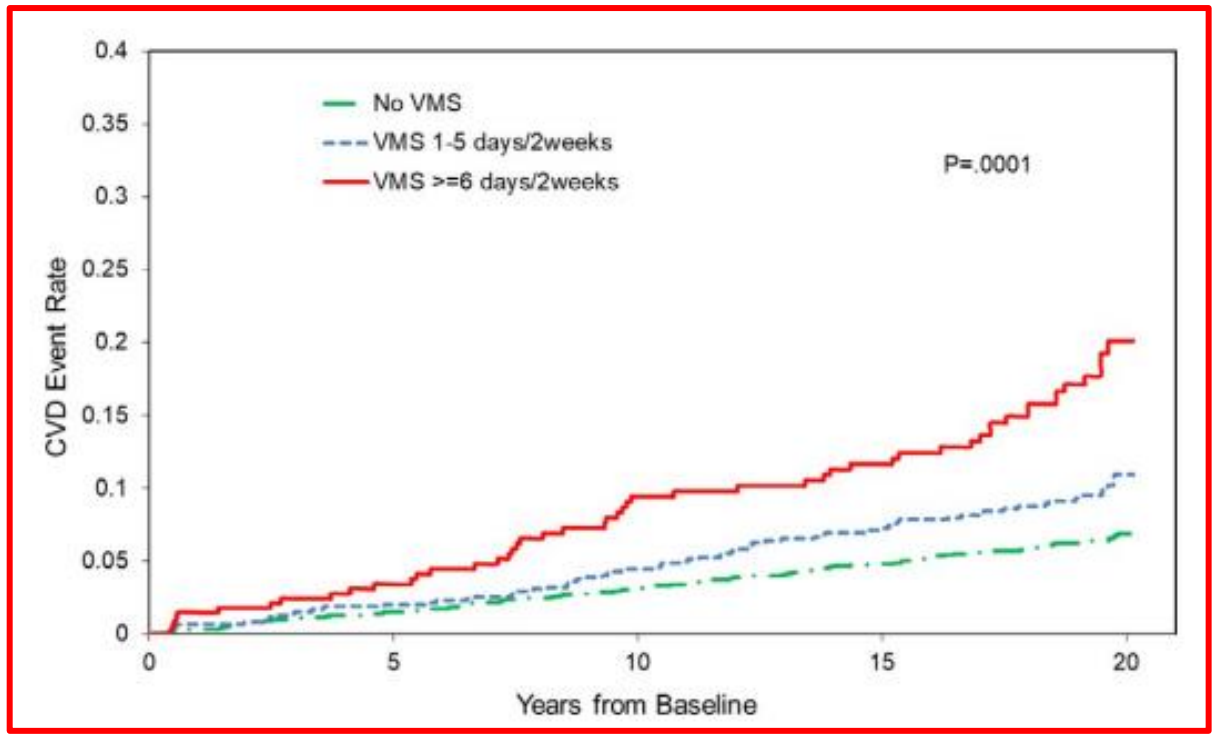
N. Biglia[a], A. Cagnacci[b], M. Gambacciani[c], S. Lello[d], S. Maffei[e] and R. E. Nappi[f]

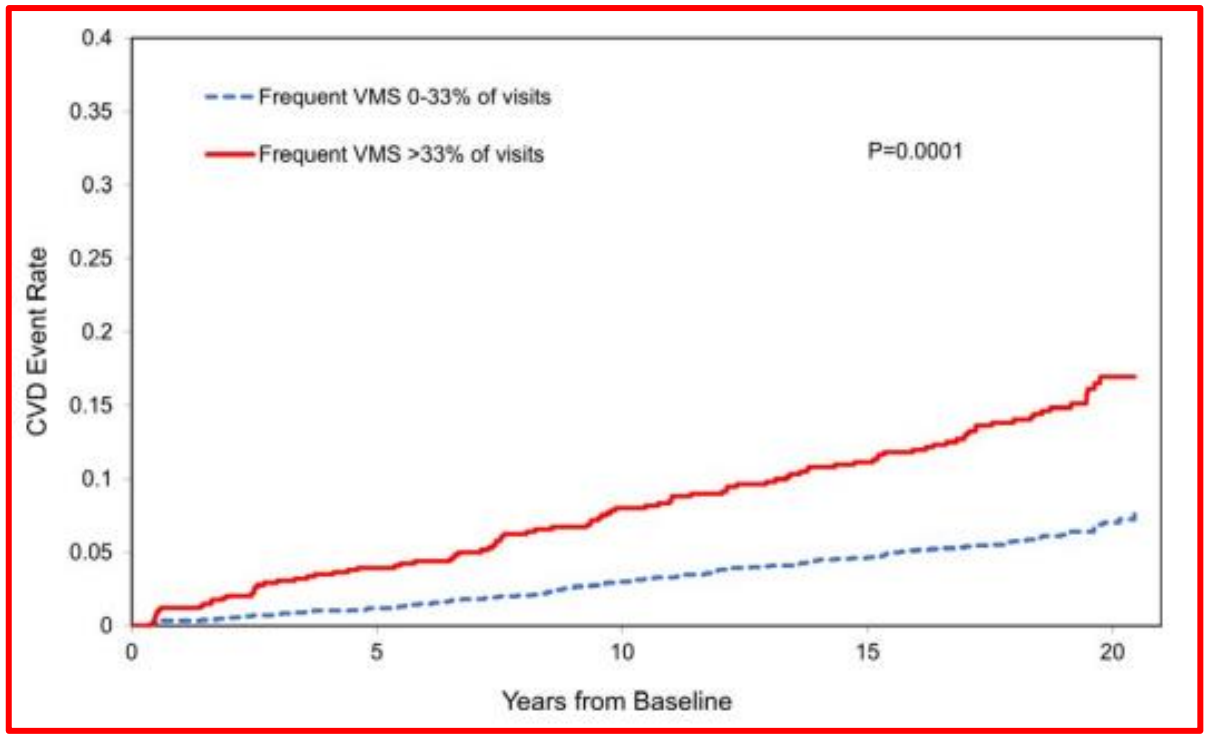
Vasomotor Symptoms impacts

- Unfavorable CVD risk profile
- Osteoporosis
- Cognitive decline

Inclusion of these data in an appropriate risk assessment

Baseline vasomotor symptoms (VMS) in relation to fatal and nonfatal cardiovascular disease (CVD) events





RC Thurston et Al J Am Heart Assoc. 2021

Menopausal Vasomotor Symptoms and Risk of Incident Cardiovascular Disease Events in SWAN

Rebecca C. Thurston, PhD; Helen E. Aslanidou Vlachos, MSc; Carol A. Derby, PhD; Elizabeth A. Jackson, MD, MPH; Maria Mori Brooks, PhD; Karen A. Matthews, PhD; Sioban Harlow, PhD; Hadine Joffe, MD, MSc; Samar R. El Khoudary, PhD, MPH

BACKGROUND: Cardiovascular disease (CVD) in women has unique features, including associations with reproductive factors that are incompletely understood. Vasomotor symptoms (VMS), the classic menopausal symptom, are linked to CVD risk factors and subclinical CVD. Evidence linking VMS to CVD events is limited. We tested whether frequent and/or persistent VMS were associated with increased risk for fatal and nonfatal CVD events in SWAN (Study of Women's Health Across the Nation).

METHODS AND RESULTS: A total of 3083 women, aged 42 to 52 years at baseline, underwent up to 16 in-person visits over 22 years. Assessments included questionnaires on VMS frequency (0, 1–5, or ≥6 days/2 weeks), physical measures, phlebotomy, and reported CVD events (myocardial infarction, stroke, heart failure, and revascularization). A subset of events was adjudicated via medical record. Death certificates were obtained. Relationships between baseline VMS or persistent VMS over the follow-up (proportion of visits with frequent VMS) with combined incident nonfatal and fatal CVD were tested in Cox proportional hazards models adjusted for demographics, medication use, and CVD risk factors. Participants experienced 231 CVD events over the follow-up. Women with frequent baseline VMS had an elevated risk of subsequent CVD events (relative to no VMS; ≥6 days: hazard ratio [HR] [95% CI], 1.51 [1.05–2.17], P=0.03; 1–5 days: HR [95% CI], 1.02 [0.75–1.39], P=0.89, multivariable). Women with frequent VMS that persisted over time also had an increased CVD event risk (>33% versus ≤33% of visits: HR [95% CI], 1.77 [1.33–2.35], P<0.0001, multivariable).

CONCLUSIONS: Frequent and persistent VMS were associated with increased risk of later CVD events. VMS may represent a novel female-specific CVD risk factor.

Journal of the American Heart Association

ORIGINAL RESEARCH

Menopausal Vasomotor Symptoms and Risk of Incident Cardiovascular Disease Events in SWAN

Rebecca C. Thurston, PhD; Helen E. Aslanidou Vlachos, MSc; Carol A. Derby, PhD; Elizabeth A. Jackson, MD, MPH; Maria Mori Brooks, PhD; Karen A. Matthews, PhD; Sioban Harlow, PhD; Hadine Joffe, MD, MSc; Samar R. El Khoudary, PhD, MPH

Vasomotor symptoms (VMS), the classic menopausal symptom, are linked to **CVD risk factors and subclinical CVD**

Frequent and persistent VMS were associated with increased risk of later CVD events. VMS may represent a novel female-specific CVD risk factor

RC Thurston et Al J Am Heart Assoc. 2021

Risk Factor Profiles in Women

Traditional atherosclerotic cardiovascular (ASCVD) risk factors, and their differential impact in women

>80% midlife women have one or more traditional risk factors

Clustering is common after menopause

Emerging, nontraditional risk factors

Unawareness of CVD as the primary cause of mortality in women

Lack of awareness also among healthcare professionals

M Garcia, S. L. Mulvagh, C. Noel Bairey Merz, J. E. Buring, JAnn E. Manson Circ Research 2016

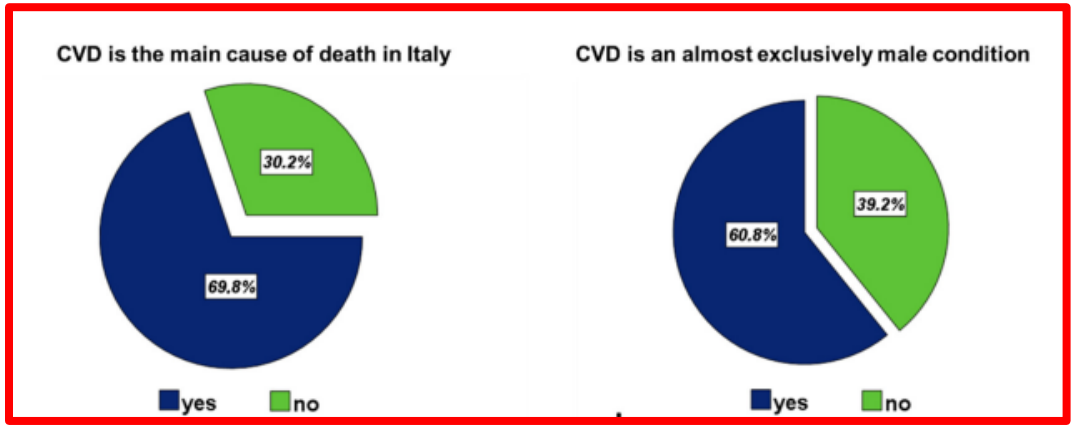
Journal of *Clinical Medicine*

MDPI

Article

Cardiovascular Risk Perception and Knowledge among Italian Women: Lessons from IGENDA Protocol

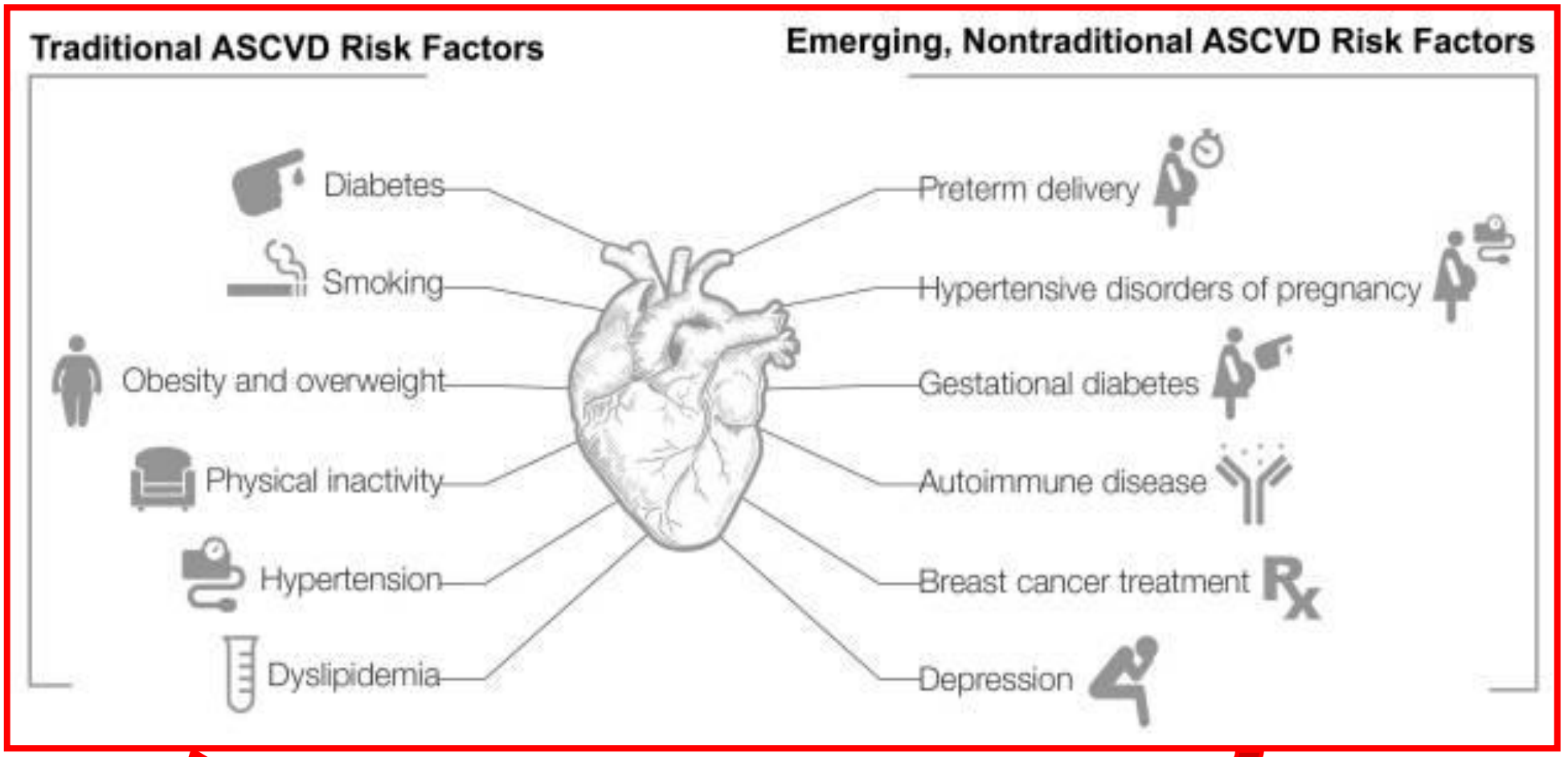
Silvia Maffei [1,*], Antonella Meloni [2], Martino Deidda [3], Susanna Sciomer [4], Lucia Cugusi [5], Christian Cadeddu [3], Sabina Gallina [6], Michela Franchini [7], Giovanni Scambia [8], Anna Vittoria Mattioli [9], Nicola Surico [10], Giuseppe Mercuro [3] and IGENDA Study Group [†] on behalf of the Italian Society of Cardiology (SIC) and the Italian Society of Obstetrics and Gynecology (SIGO)



The findings of this study highlight the low perception of cardiovascular risk in Italian women and suggest an *urgent need to enhance knowledge and perception of CVD risk in women* as a real health problem and not just as a as a life-threatening threat.

J. Clin. Med. 2022, 11, 1695. https://doi.org/10.3390/jcm11061695

Traditional vs Emerg(ED) CV risk factors in women

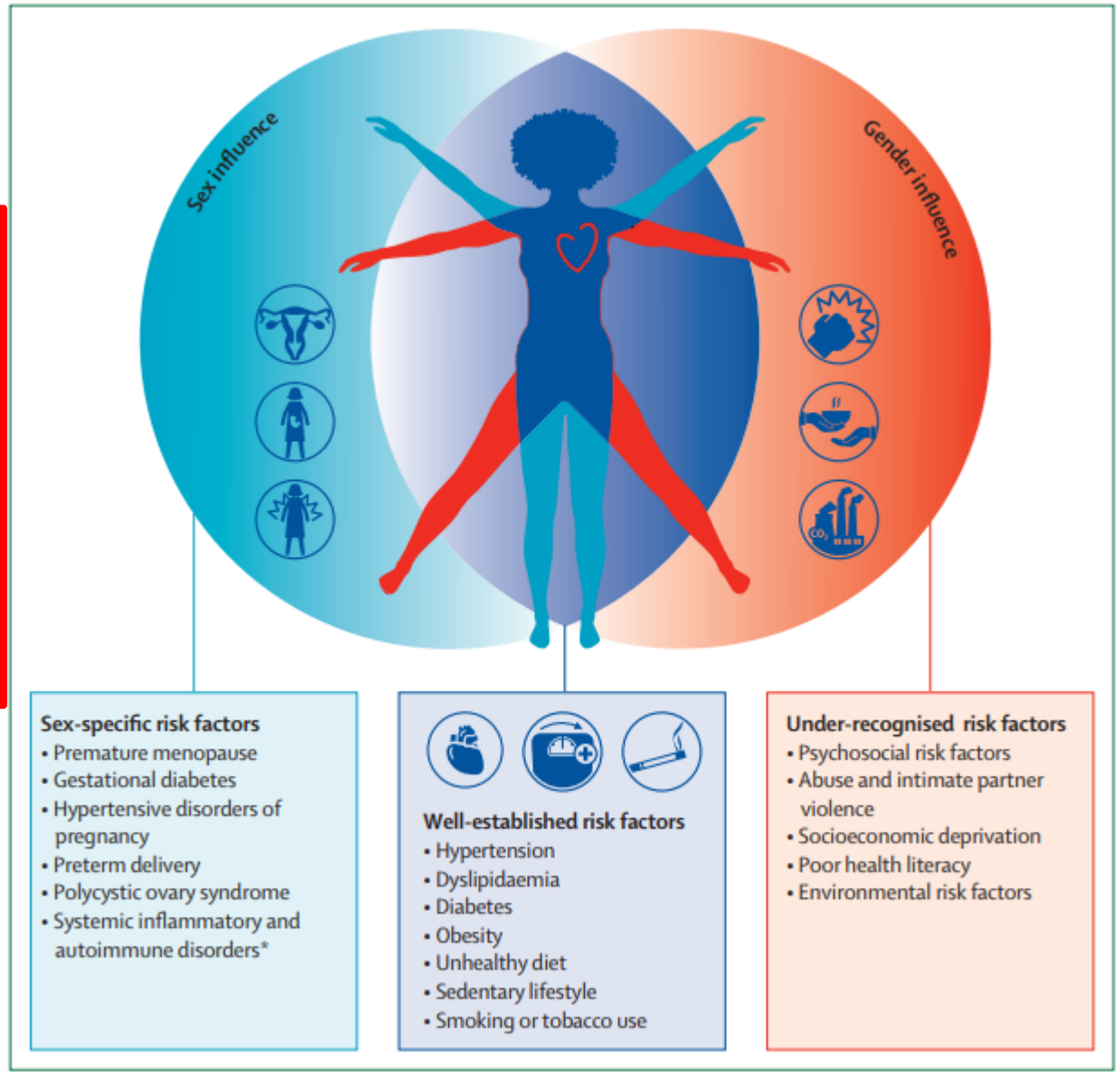


M Garcia, S. L. Mulvagh, C. Noel Bairey Merz, J. E. Buring, JAnn E. Manson Circ Research 2016

The *Lancet* women and cardiovascular disease Commission: reducing the global burden by 2030

Birgit Vogel, Monica Acevedo, Yolande Appelman, C Noel Bairey Merz, Alaide Chieffo, Gemma A Figtree, Mayra Guerrero, Vijay Kunadian, Carolyn S P Lam, Angela H E M Maas, Anastasia S Mihailidou, Agnieszka Olszanecka, Jeanne E Poole, Clara Saldarriaga, Jacqueline Saw, Liesl Zühlke, Roxana Mehran

Cardiovascular disease is the leading cause of death in women. Decades of grassroots campaigns have helped to raise awareness about the impact of cardiovascular disease in women, and positive changes affecting women and their health have gained momentum. Despite these efforts, there has been stagnation in the overall reduction of cardiovascular disease burden for women in the past decade. Cardiovascular disease in women remains understudied, under-recognised, underdiagnosed, and undertreated. This Commission summarises existing evidence and identifies knowledge gaps in research, prevention, treatment, and access to care for women. Recommendations from an international team of experts and leaders in the field have been generated with a clear focus to reduce the global burden of cardiovascular disease in women by 2030. This Commission represents the first effort of its kind to connect stakeholders, to ignite global awareness of sex-related and gender-related disparities in cardiovascular disease, and to provide a springboard for future research.



Lancet 2021; 397: 2385–438

Median age of Natural Menopause: 50 yrs.
Natural menopause is considered premature if it occurs before 40 yrs of age and early if it occurs between 40 and 45 yrs of age.

Because of the trends for increases in overall life expectancy in the US and in Western Countries, a significant proportion of women will spend up to 40% of their lives postmenopausal.

Earlier age at natural menopause is generally reported as a marker of greater CVD risk

Iatrogenically induced menopause during the premenopausal period is associated with higher CVD risk

Am J Cardiol. 2018 October 01; 122(7): 1161–1168. doi:10.1016/j.amjcard.2018.06.039.

Serial Studies in Subclinical Atherosclerosis During Menopausal Transition (From the Study of Women's Health Across the Nation)

Zubair A. Khan, MD[a,b], Imke Janssen, PhD[c], Joanne K. Mazzarelli, MD[a], Lynda H. Powell, Ph.D[c], Andrius Dumasius[c], Susan A. Everson-Rose, PhD[d], Emma Barinas-Mitchell, Ph.D[e], Karen Matthews, PhD[f], Samar R. El Khoudary, PhD[e], Perry J. Weinstock, MD[a], and Steven M. Hollenberg, MD[a,c]

Physiologic changes may be a particularly sensitive measure of perimenopausal changes (a marker of subclinical atherosclerosis)

Changes in lipids did not correlate with changes in a PWV

Serial assessment of such changes could potentially elucidate mechanisms of disease and identify women to target for aggressive lifestyle risk factor modification

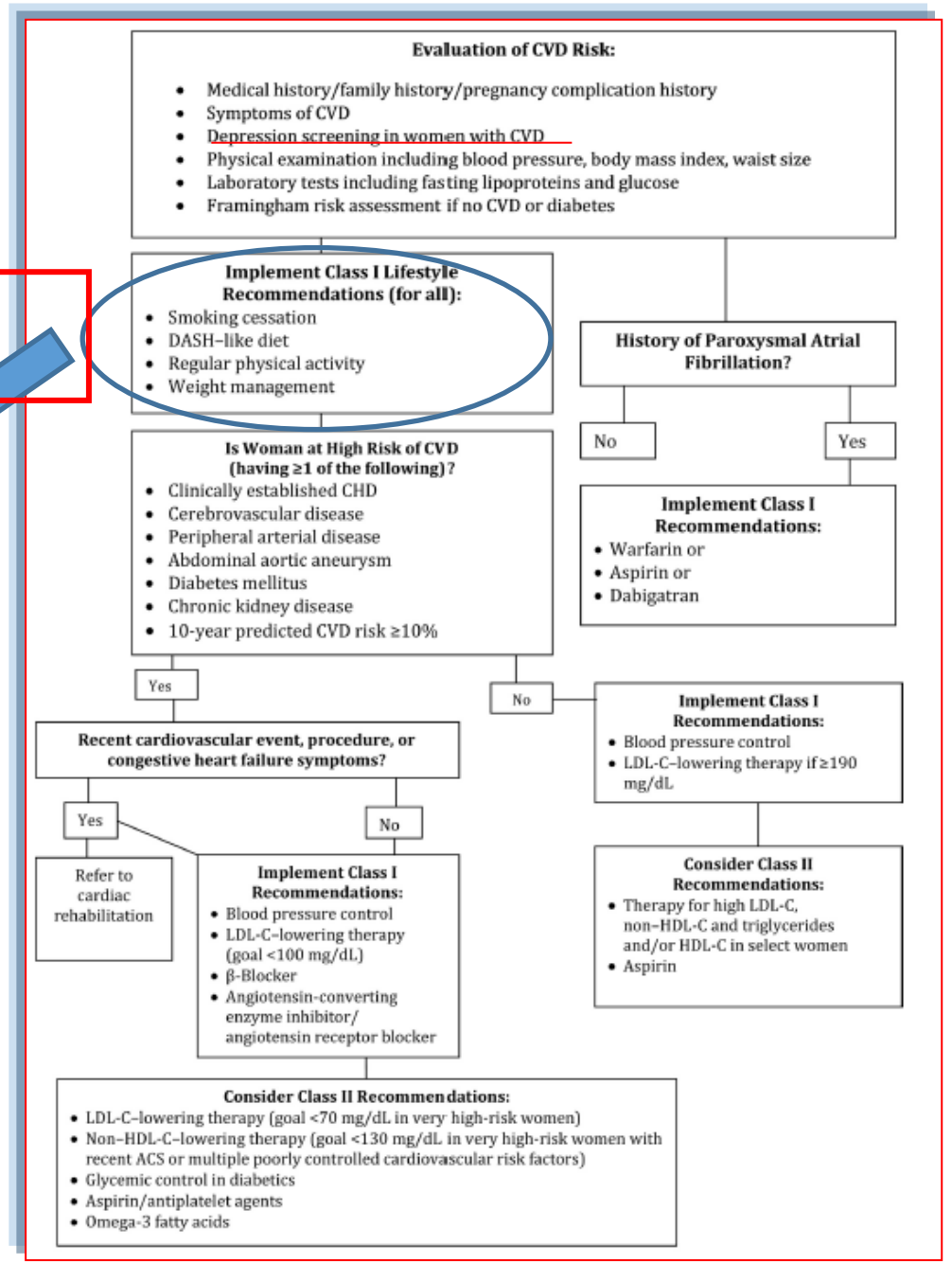
CVD preventive care in Women

Lifestyle approaches to the prevention of CVD is likely the most cost – effective strategy

Smoking cessation
DASH like diet
Regular physical activity
Weight management

Dietary Approaches to Stop Hypertension

Nutrient	Serving	Serving Size
Fruits and vegetables	≥4.5 cups/d	1 cup raw leafy vegetable, 1/2 cup cut-up raw or cooked vegetable, 1/2 cup vegetable juice; 1 medium fruit, 1/4 cup dried fruit, 1/2 cup fresh, frozen, or canned fruit, 1/2 cup fruit juice
Fish	2/wk	3.5 oz, cooked (preferably oily types of fish)
Fiber	30 g/d (1.1 g/10 g carbohydrate)	Bran cereal, berries, avocado, etc
Whole grains	3/d	1 slice bread, 1 oz dry cereal, 1/2 cup cooked rice, pasta, or cereal (all whole-grain products)
Sugar	≤5/wk (≤450 kcal/wk from sugar-sweetened beverages)	1 tablespoon sugar, 1 tablespoon jelly or jam, 1/2 cup sorbet, 1 cup lemonade
Nuts, legumes, and seeds	≥4/wk	1/3 cup or 1 1/2 oz nuts (avoid macadamia nuts and salted nuts), 2 tablespoons peanut butter, 2 tablespoon or 1/2 oz seeds, 1/2 cup cooked legumes (dry beans and peas)
Saturated fat	<7%/total energy intake	Found in fried foods, fat on meat or chicken skin, packaged desserts, butter, cheese, sour cream, etc
Cholesterol	<150 mg/d	Found in animal meats, organ meats, eggs, etc
Alcohol	≤1/d	4 oz wine, 12 oz beer, 1.5 oz of 80-proof spirits, or 1 oz of 100-proof spirits
Sodium	<1500 mg/d	
Trans-fatty acids	0	0



Mosca L. et Al Circulation 2011

Risk Factors in Women
Physical Inactivity

According to data from a 2011 National Health Interview Survey (NHIS) in adults, inactivity was higher among women than men (33.2% versus 29.9%, age-adjusted) and increased with age (from 26.1% to 52.4%).

Schiller JS LJ et Al: Summary Health Statistics for US Adults: National Health Interview Survey, 2010

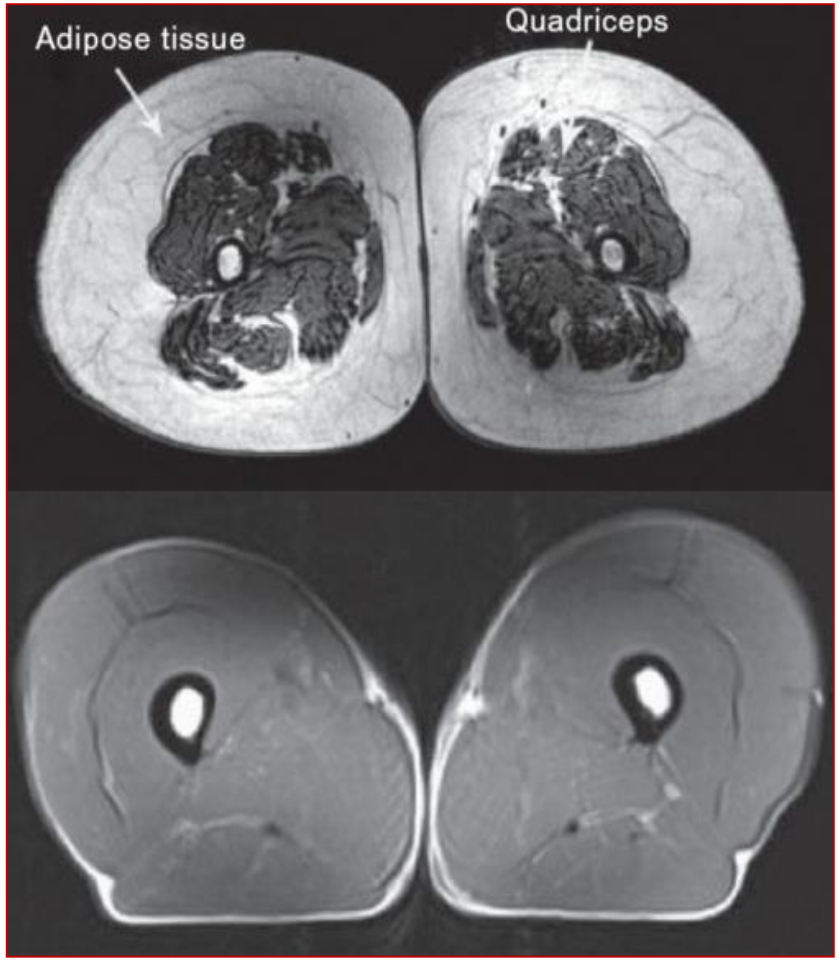
Physical inactivity 	**SEX-BASED DIFFERENCES** The prevalence of inactivity and sedentary behaviors is higher among women than men.	Overwhelming evidence indicates that regular physical activity is one of the most powerful health-promoting practices that clinicians can recommend for patients. Women should be advised to accumulate at least 150 min/wk of moderate exercise, 75 min/wk of vigorous exercise, or an equivalent combination.

Garcia M **Cardiovascular Disease in Women: Clinical Perspectives** 2017

Overweight and Sarcopenia

Impact of whole body electromyostimulation on cardiometabolic risk factors in older women with sarcopenic obesity: the randomized controlled FORMOsA-sarcopenic obesity study

Wittmann K, Clin Int Aging 2016



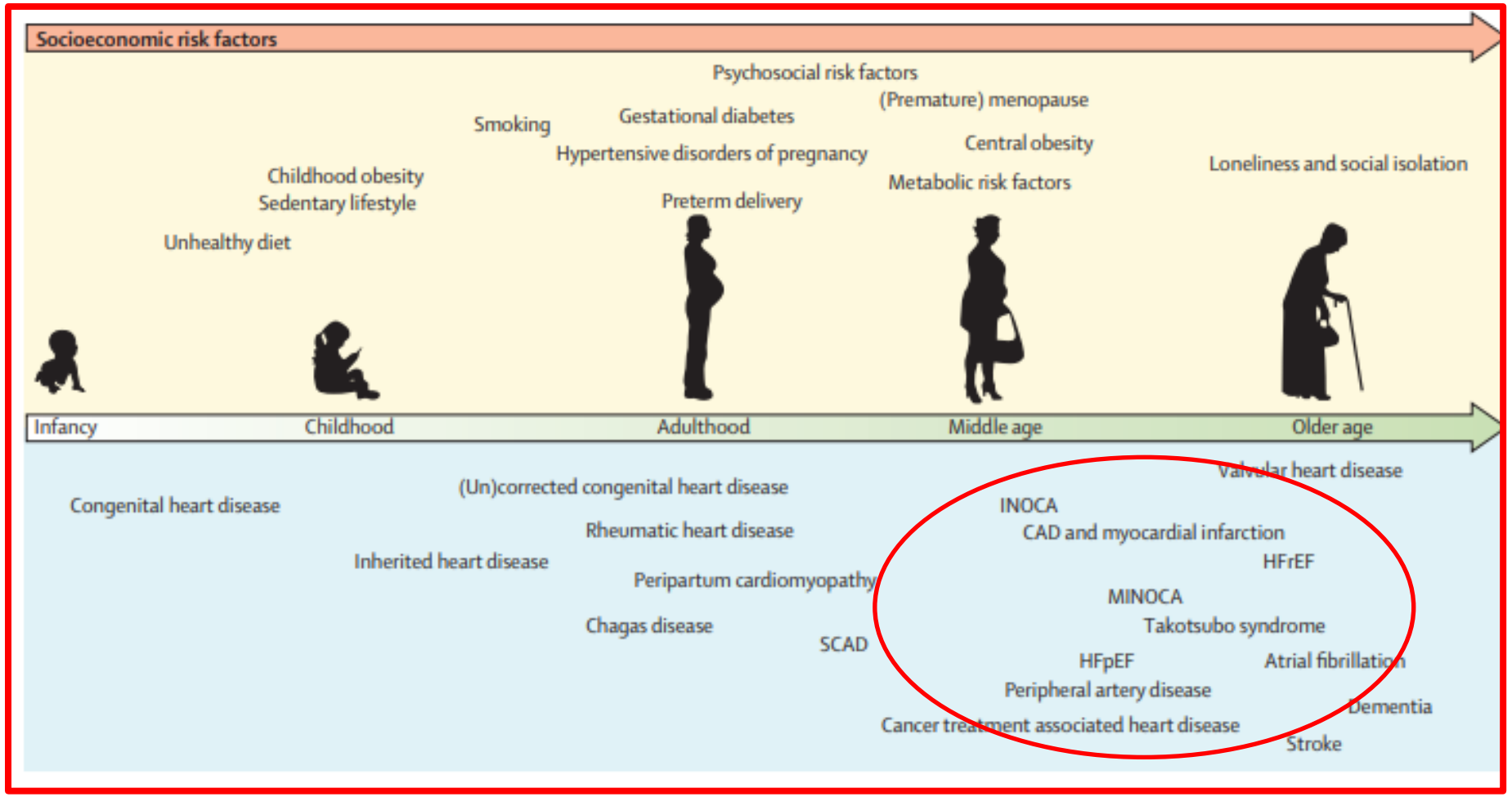
73 years old Female (BMI = 24.5 kg/m2)

21 years old Female (BMI = 24.3 kg/m2)

The *Lancet* women and cardiovascular disease Commission: reducing the global burden by 2030

Birgit Vogel, Monica Acevedo, Yolande Appelman, C Noel Bairey Merz, Alaide Chieffo, Gemma A Figtree, Mayra Guerrero, Vijay Kunadian, Carolyn S P Lam, Angela H E M Maas, Anastasia S Mihailidou, Agnieszka Olszanecka, Jeanne E Poole, Clara Saldarriaga, Jacqueline Saw, Liesl Zühlke, Roxana Mehran

Cardiovascular diseases and their risk factors and modifiers during the lifecycle of a woman



The Lancet 2021

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Editorial

Age at menopause: A fundamental data of interest to acquire in female patients' anamnesis

Susanna Sciomer [a,*], Carlotta De Carlo [a], Federica Moscucci [a], Silvia Maffei [b,c]

Physicians learn to acquire the main anamnestic data concerning the female hormonal life, starting from menarche, through pregnancy, up to the hormonal therapies that accompany and follow menopause

The age at menopause is, in itself, a fundamental item to be acquired, in order to plan the right timing for prevention and possible tailored treatments

View point

Menopausal hormone therapy and breast cancer risk: the cardiological point of view

Susanna Sciomer and Federica Moscucci

J Cardiovasc Med 2020, 21:538–539

In a recent issue of the Lancet Collaborative Group on Hormonal Factors in Breast Cancer, a study analysed the correlation between hormone replacement therapy (HRT) and breast cancer in a sizable population with a prolonged follow-up.[1] The authors used a meta-analysis technology considering 58 articles conducted starting from 1992. This study underscores the relationship between one the most worrying diseases among women and HRT in western countries. However, in western countries, the first causes of morbidity and mortality in postmenopausal women are cardiovascular diseases (CVDs) and specifically ischemic heart diseases.[2] Whereas the effect of different hormones, a combination of molecules and doses were analysed together, as clearly stated in the commentary by Kotsopoulos,[3] the study's results were clear, reporting conclusive data about the increased risk of breast cancer in women receiving HRT.

Our group has previously felt the urgent need for a scrupulous revision of current cardiovascular guidelines from a sex-specific point of view, on the basis of evidence that certain peculiar or exclusive conditions in women could alter their personal risk, clinical presentation, therapeutic response and prognosis in CVDs.[8] The age at menopause[9] is a dramatically important datum to acquire in the clinical context and HRT could modify the personal risk profile of the patient.

European Journal of Preventive Cardiology

ESC European Society of Cardiology

Commentary

Prevention of cardiovascular risk factors in women: The lifestyle paradox and stereotypes we need to defeat

S Sciomer[1], F Moscucci[1], S Maffei[2], S Gallina[3] and AV Mattioli[4]

European Journal of Preventive Cardiology
2019, Vol. 26(6) 609–610

DOI: 10.1177/2047487318810560
journals.sagepub.com/home/ejpc
SAGE

ESC European Society of Cardiology

European Journal of Preventive Cardiology (2022) **00**, 1–4
https://doi.org/10.1093/eurjpc/zwac143

Acute coronary syndrome in women: a new and specific approach is needed

Federica Moscucci [1], Franco Lavalle [2,3], Cecilia Politi [4], Antonella Campanale [5], Giovanella Baggio [6,1], and Susanna Sciomer [1]*

[1]Department of Clinical and Internal Medicine, Anesthesiology and Cardiovascular Sciences, University of Rome 'Sapienza', Rome, Italy; [2]OMCEO (Provincial Order Council of Surgeons and Dentists), Bari, Italy; [3]G.I.S.e G. (Gender and Health Italian Group), Italy; [4]Internal Medicine Department, Gender Medicine Area F.A.D.O.I., Isernia, Italy; [5]Medical Device and Pharmaceutical Service—Italian Ministry of Health, Rome, Italy; and [6]Department of Medicine, University of Padua, Padua, Italy

Online publish-ahead-of-print 26 July 2022

ESC European Society of Cardiology

European Journal of Preventive Cardiology (2022) **00**, 1–4
https://doi.org/10.1093/eurjpc/zwac143

Acute coronary syndrome in women: a new and specific approach is needed

Federica Moscucci [1], Franco Lavalle [2,3], Cecilia Politi [4], Antonella Campanale [5], Giovanella Baggio [6,1], and Susanna Sciomer [1]*

[1]Department of Clinical and Internal Medicine, Anesthesiology and Cardiovascular Sciences, University of Rome 'Sapienza', Rome, Italy; [2]OMCEO (Provincial Order Council of Surgeons and Dentists), Bari, Italy; [3]G.I.S.e G. (Gender and Health Italian Group), Italy; [4]Internal Medicine Department, Gender Medicine Area F.A.D.O.I., Isernia, Italy; [5]Medical Device and Pharmaceutical Service—Italian Ministry of Health, Rome, Italy; and [6]Department of Medicine, University of Padua, Padua, Italy

Online publish-ahead-of-print 26 July 2022

Table 1 **The most recent up-to-date papers dealing with the sex/gender bias about ischaemic heart disease and its awareness and outcomes**

Authors	Journal	Background	Conclusions
Vynckier *et al.* EUROAPIRE V Investigation Group[9]	EJPC 2022	'Risk factor control of CHD women is substantial worse compared with men.'	'Further actions are needed to *increase the awareness* of the worse risk factor control in female CHD patients.'
Gaudino *et al.*[10]	JACC 2022	'Sex-related differences in treatment outcomes … involve interactions among biological, social, and cultural factors.'	'Further research is needed to *improve the application and outcomes of treatment* for women with CAD.'
Lucà *et al.*[11]	J Clin Med 2022—Review	'A *higher mortality rate* and *a poorer prognosis* are more common in women.'	'There are substantial sex differences in CVD, so *different strategies are needed*.'
Nussbaum *et al.*[12]	JACC 2022	'The *adjusted morbidity and mortality are persistently higher*, particularly in younger women and Blacks.'	*'Future research focus includes sex-specific outcomes*, characterization of the biological differences, and *implementation science around quality of clinical care*.'
Daponte-Codina *et al.*[13]	Int J Environ Res Public Health. 2022	'Women were approximately *five times less likely than men to consider heart disease* as a main health issue or *leading cause of death*'	'Development of a *European strategy targeting improved awareness* of CAD and reduced gender and social inequalities within the European population is warranted.'
Mehilli and Presbitero[14]	Heart 2020—Review	'There are *important dissimilarities*… among men and women with acute coronary syndrome.'	'Understanding the *particular physiopathology of MINOCA* and *developing programs targeting comorbidities* and depression-related behavioural risk factors are urgently needed.'

CHD, coronary heart disease; CAD, coronary artery disease; CVD, cardiovascular disease; MINOCA, myocardial infarction with non-obstructive coronary arteries.

ESC European Society of Cardiology
European Journal of Preventive Cardiology (2022) **00**, 1–4
https://doi.org/10.1093/eurjpc/zwac143

LETTER TO THE EDITOR
Gender-specific conditions

Acute coronary syndrome in women: a new and specific approach is needed

Federica Moscucci [1], Franco Lavalle [2,3], Cecilia Politi [4], Antonella Campanale [5], Giovanella Baggio [6,1], and Susanna Sciomer [1]*

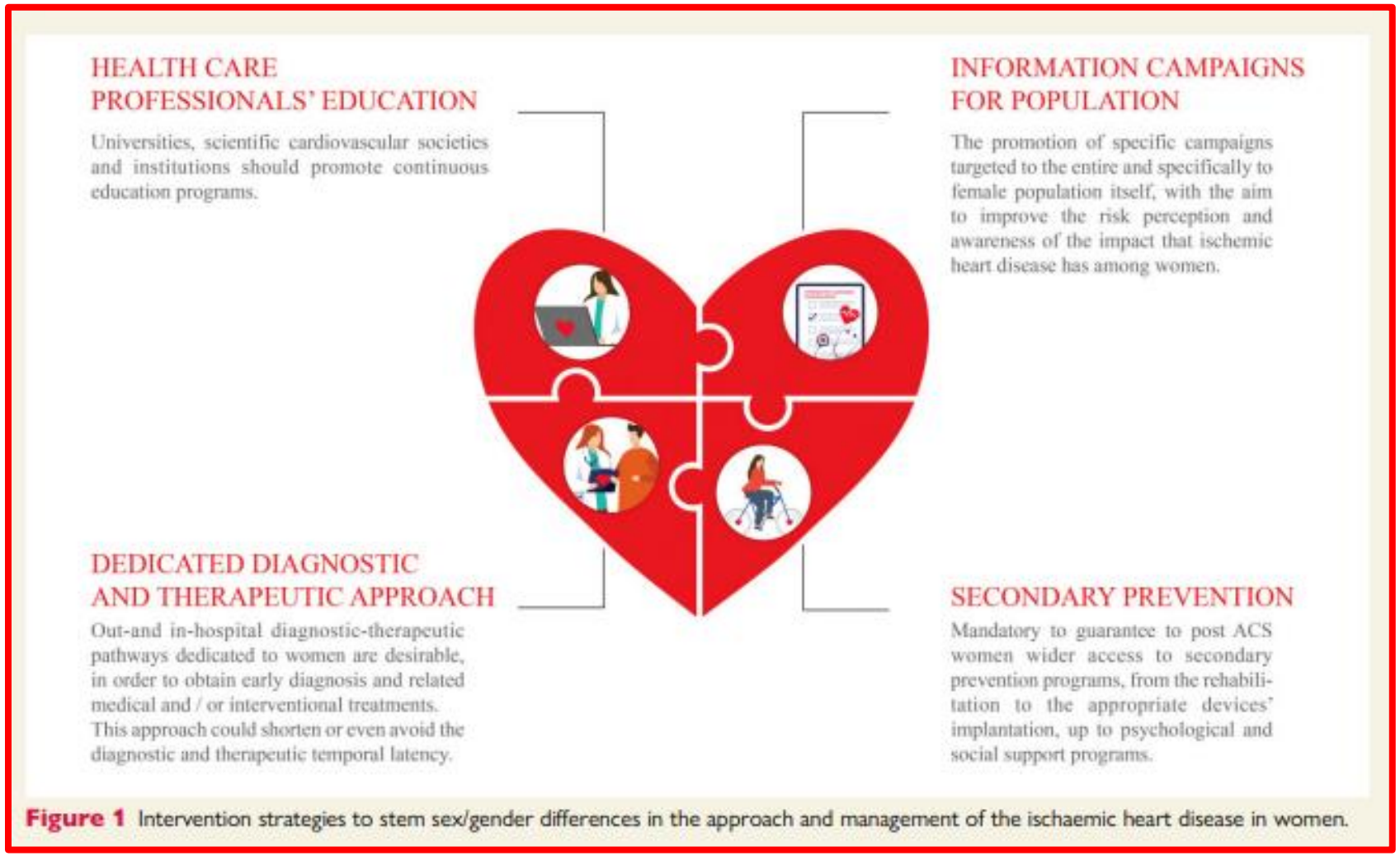


Figure 1 Intervention strategies to stem sex/gender differences in the approach and management of the ischaemic heart disease in women.

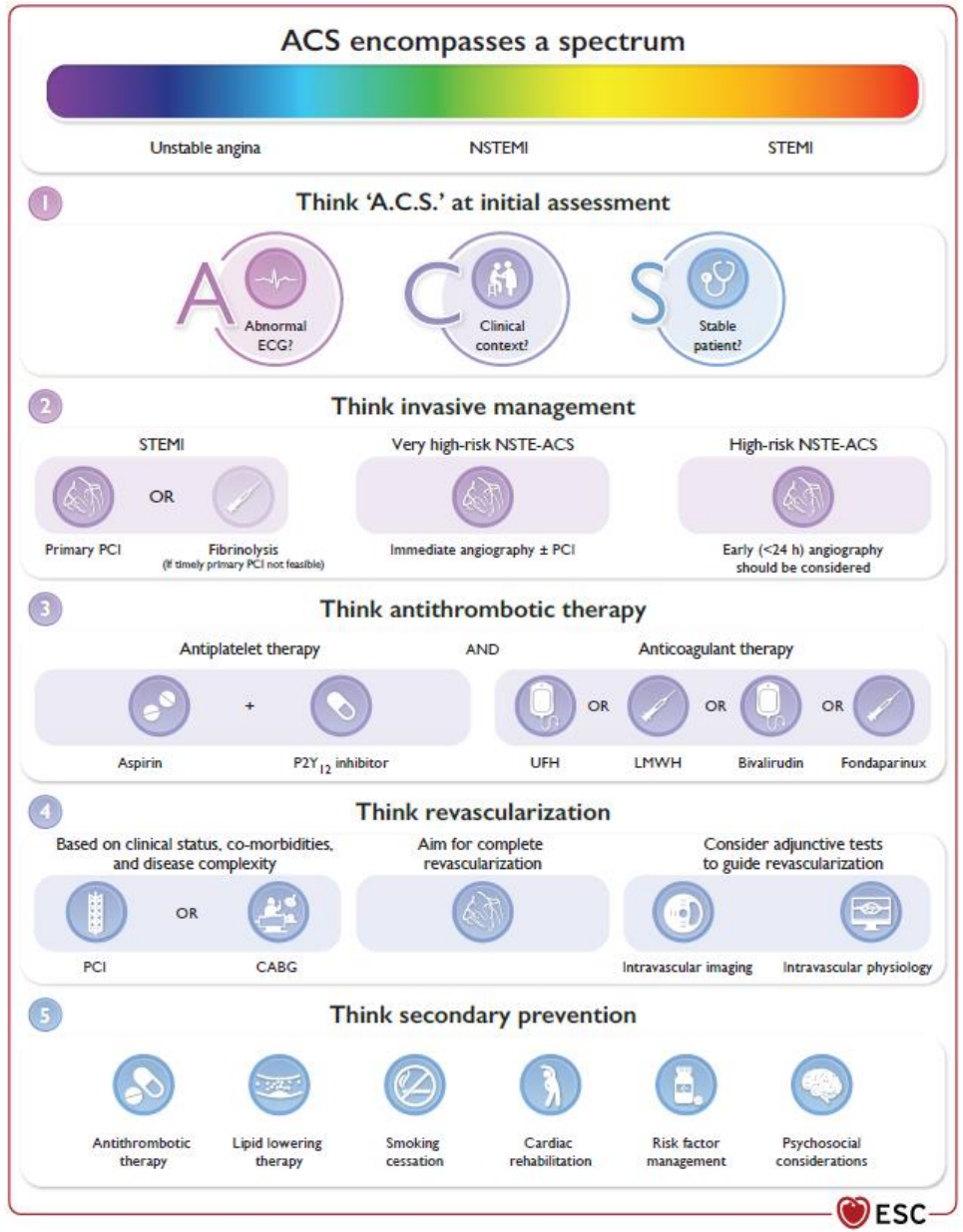
ESC
European Society of Cardiology

European Heart Journal (2023) **00**, 1–107
https://doi.org/10.1093/eurheartj/ehad191

ESC GUIDELINES

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)


ACS encompasses a spectrum
Unstable angina
NSTEMI
STEMI
1
Think 'A.C.S.' at initial assessment
A
Abnormal ECG?
C
Clinical context?
S
Stable patient?
2
Think invasive management
STEMI
OR
Primary PCI
Fibrinolysis
(If timely primary PCI not feasible)
Very high-risk NSTE-ACS
Immediate angiography ± PCI
High-risk NSTE-ACS
Early (<24 h) angiography should be considered
3
Think antithrombotic therapy
Antiplatelet therapy
AND
Anticoagulant therapy
+
OR
OR
OR
Aspirin
P2Y12 inhibitor
UFH
LMWH
Bivalirudin
Fondaparinux
4
Think revascularization
Based on clinical status, co-morbidities, and disease complexity
OR
PCI
CABG
Aim for complete revascularization
Consider adjunctive tests to guide revascularization
Intravascular imaging
Intravascular physiology
5
Think secondary prevention
Antithrombotic therapy
Lipid lowering therapy
Smoking cessation
Cardiac rehabilitation
Risk factor management
Psychosocial considerations
ESC

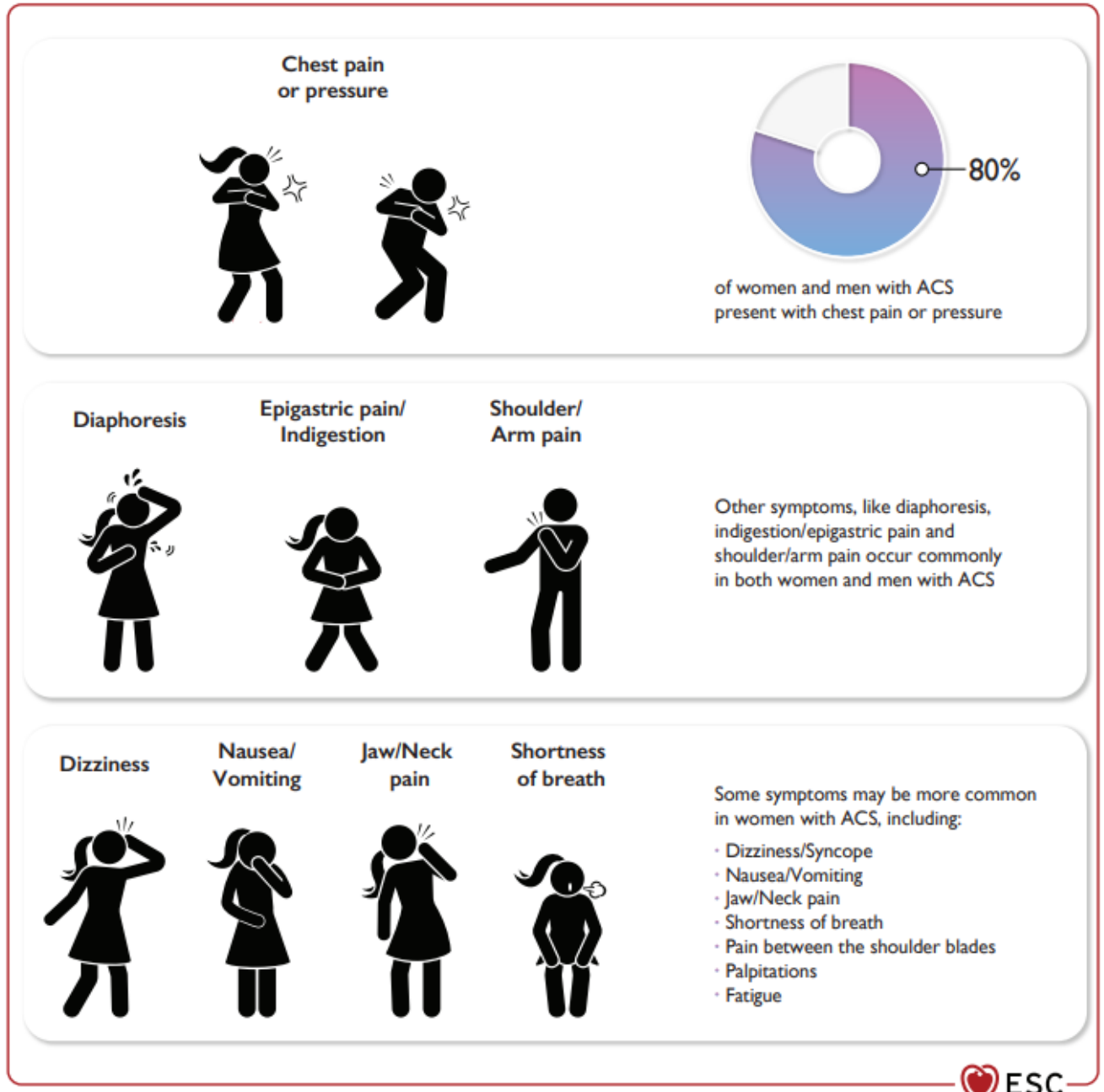
Journal of Cardiovascular Medicine

Gender differences in Cardiology: is it time for new guidelines?

Susanna Sciomer, MD; Federica Moscucci, MD; Christian Cadeddu Dessalvi, MD, PhD; Martino Deidda, MD, PhD; Giuseppe Mercuro, MD

J Cardiovasc Med (Hagerstown). 2018 Dec;19(12):685-688

Figure S1 Symptoms at presentation in acute coronary syndrome in women and men. ACS, acute coronary syndrome.



ESC European Society of Cardiology
European Heart Journal (2023) **00**, 1–107
https://doi.org/10.1093/eurheartj/ehad191

ESC European Society of Cardiology
European Heart Journal (2023) **00**, 1–107
https://doi.org/10.1093/eurheartj/ehad191

17. Sex differences

There are currently no data supporting the differential management of ACS based on sex. However, several studies have reported that women presenting with ACS are treated differently than men.[914–918] This includes being less likely than men to receive ICA, timely revascularization, CR, and secondary prevention medications.[914–918]

Healthcare providers and policymakers should be conscious of this potential gender bias in the management of ACS and make a concerted effort to ensure that women with ACS receive evidence-based care.

In order to ensure the generalizability of the findings yielded by RCTs, patient recruitment should be reflective of real-world populations from different socioeconomic backgrounds.[919] Several studies have reported that a disproportionately low proportion of women are recruited to CV trials.[920–922] Alongside historic underrepresentation of other subsets of patients, including older patients and ethnic minorities, this suggests an underlying recruitment bias.[923] Increased representation of female patients in future clinical trials is required to better inform the optimal management of women with ACS.[924]

Conclusion

Menopause Transition: a time when key CVD risk factors and indices of vascular health worsen,
independent of the effects of aging alone

Menopause, aging, and the increase in CVD risk occur somewhat synchronously, and cross-sectional analyses cannot elucidate mechanisms of change

Khan ZA et Al. Am J Cardiol 2018

Matthews KA et Al. *Stroke*. 2017;48:70–76.

Janssen I et Al. *Arch Intern Med*. 2008;168:1568–1575.

El Khoudary SR et Al. *Menopause*.2013;20:8–14.