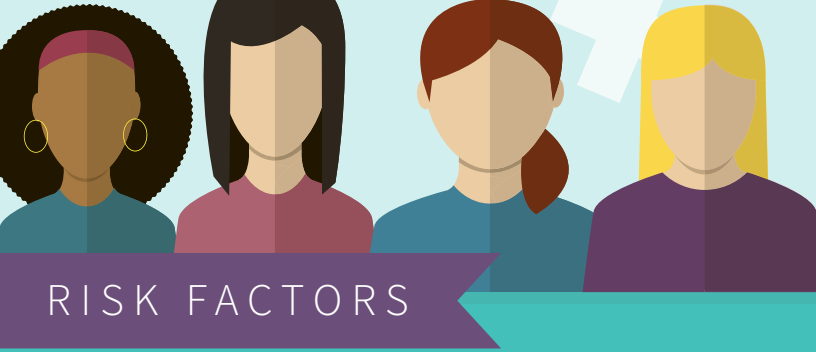


# What We Know about Women and Heart Disease



## RISK FACTORS

### Traditional risk factors with greater impact in women:

- Smoking
- Diabetes
- High blood pressure
- Family history of heart disease

**Hormones:** Levels vary throughout life (puberty, pregnancy, menopause, hormone replacement therapy)

### Pregnancy-related factors and conditions:

- Preeclampsia
- Gestational diabetes
- Hypertension
- Peripartum cardiomyopathy

### Psychosocial factors:

- Higher socio-economic disadvantage across all ethnic and age groups
- Tendency to prioritize care of family ahead of self-care
- Feminine gender role poses greater risk of second heart attack
- Polycystic ovary syndrome (PCOS)
- Physicians often don't discuss prevention with female patients
- Risk underestimated in older women
- Evaluation of risk using standard Framingham model less accurate

## SYMPTOMS

- Symptoms often discounted or ignored by women and health care providers

### Heart attack symptoms more commonly seen in women:

- Milder symptoms without chest pain
- Sudden onset of weakness, shortness of breath, nausea or vomiting, indigestion, tiredness, aches
- Discomfort in the back chest, arm, neck or jaw

### Chest pain and heart attack:

- Women less likely to experience chest pain, but the majority still do
- Younger women less likely to experience chest pain
- Angina is more likely the initial sign of coronary artery disease in women (vs heart attack in men)

## CONDITIONS

- Women develop heart disease and have heart attacks later in life
- Women aged 20 to 55: the only group in which heart attack rates are increasing
- Often have diffuse atherosclerosis rather than blocked coronary arteries
- Have smaller arteries and are more likely to experience endothelial and microvascular dysfunction
- Often have heart attacks with no coronary obstruction: MINOCA (myocardial infarction and non-obstructive coronary arteries)
- Heart failure with preserved ejection fraction (HFpEF) much more common in women
- Women's hearts respond (remodel) differently to the physical and functional changes caused by heart disease
- Much more likely to experience spontaneous coronary artery dissection (SCAD)
- More likely to develop heart valve disease
- More likely to suffer stroke
- Thoracic aortic aneurysms grow faster in women putting them at greater risk of dissection and death
- Women have more co-morbidities

## DIAGNOSIS

### Heart attack:

- Women without chest pain less likely to be correctly diagnosed
- Younger women more likely to be misdiagnosed for heart attack
- Exercise stress tests often produce inconclusive results
- Across all socioeconomic levels and age groups, less likely to undergo an angiogram following a heart attack
- Women with heart attack symptoms are much more likely to have normal angiograms
- Women have lower diagnostic biomarker (troponin) levels, requiring different thresholds for accurate diagnosis

### Health care provider knowledge and unconscious bias results in:

- Misinterpreted tests and misread symptoms
- Delayed diagnosis

## TREATMENT

- Treatment is often delayed and women are often under-treated
- Research has primarily focused on men
- More likely to have procedure-related bleeding events
- More likely to experience cardiac damage (cardiotoxicity) due to certain cancer treatments
- Less likely to stay on prescribed medications
- Women respond differently to many drugs, such as ACE inhibitors, statins and aspirin
- Aspirin reduces the risk of stroke in women, reduces the risk of heart attack in men
- Participation in cardiac rehabilitation has a greater impact on survival in women, but women are less likely to access rehab

## OUTCOMES

- Worse outcomes from mitral valve surgery
- Outcomes differ with bypass surgery, angioplasty, anti-clotting therapy, heart attack and peripheral arterial surgery
- Have better outcomes with catheter-based aortic valve replacement (TAVI)

### Heart attack:

- More likely to die in hospital
- Younger women are higher mortality
- Women and feminine gender less likely to return to work
- Atrial fibrillation more likely to result in stroke, heart attack, heart failure and death in women, yet women are less likely to receive anti-clotting therapy