



Medical University of Graz



Das weibliche Herz Herzinsuffizienz und Komorbiditäten

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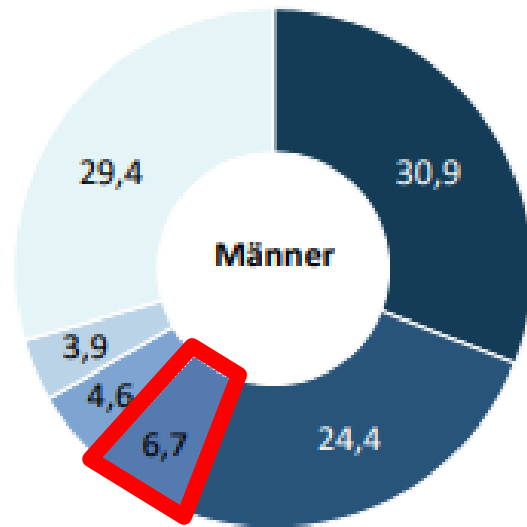
Leiter: Herzinsuffizienz/Herztransplantation, Abteilung für Kardiologie
ESC HFA Committee Member on Inflammatory Cardiomyopathies

Assoc. Professor
Lewis Katz School of Medicine, Temple University, Philadelphia, USA

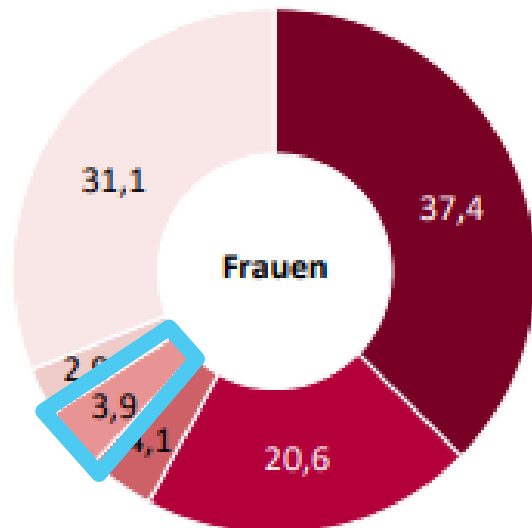


Feldbach, 10/2024

Häufigste Todesursachen (Österreich)



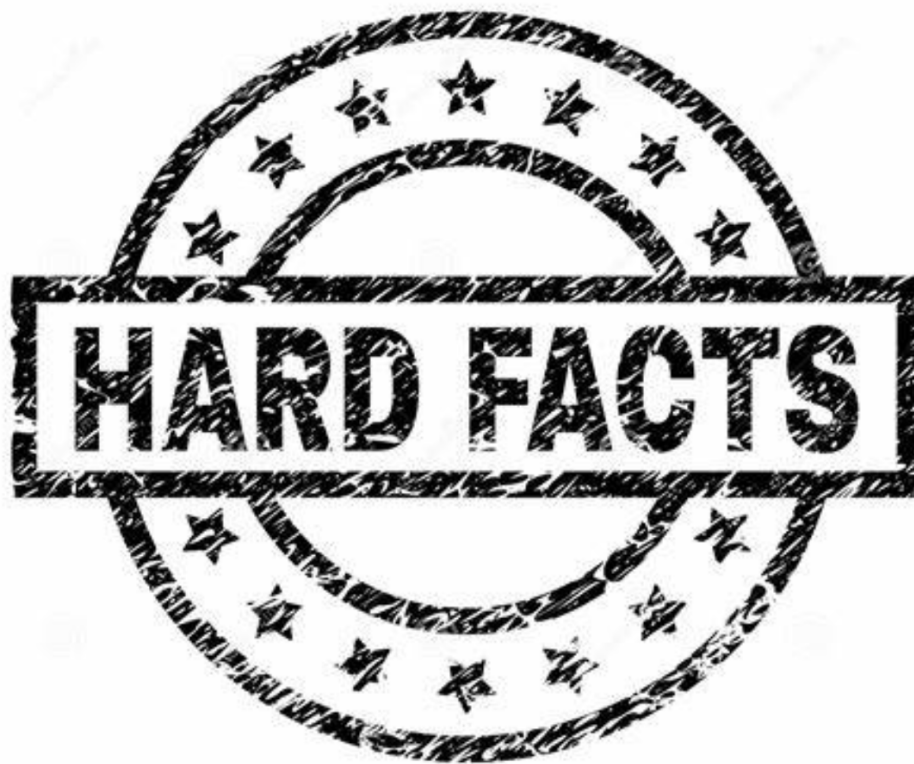
- Krankheiten des Herz-Kreislauf-Systems (I0-I99)
- Bösartige Neubildungen (C00-C97)
- Verletzungen und Vergiftungen (V01-Y89, U12)
- Krankheiten der Atmungsorgane (J00-J99)
- Krankheiten der Verdauungsorgane (K00-K92)
- Sonstige Krankheiten (A00-B99, D00-H95, L00-R99, U07-U10)



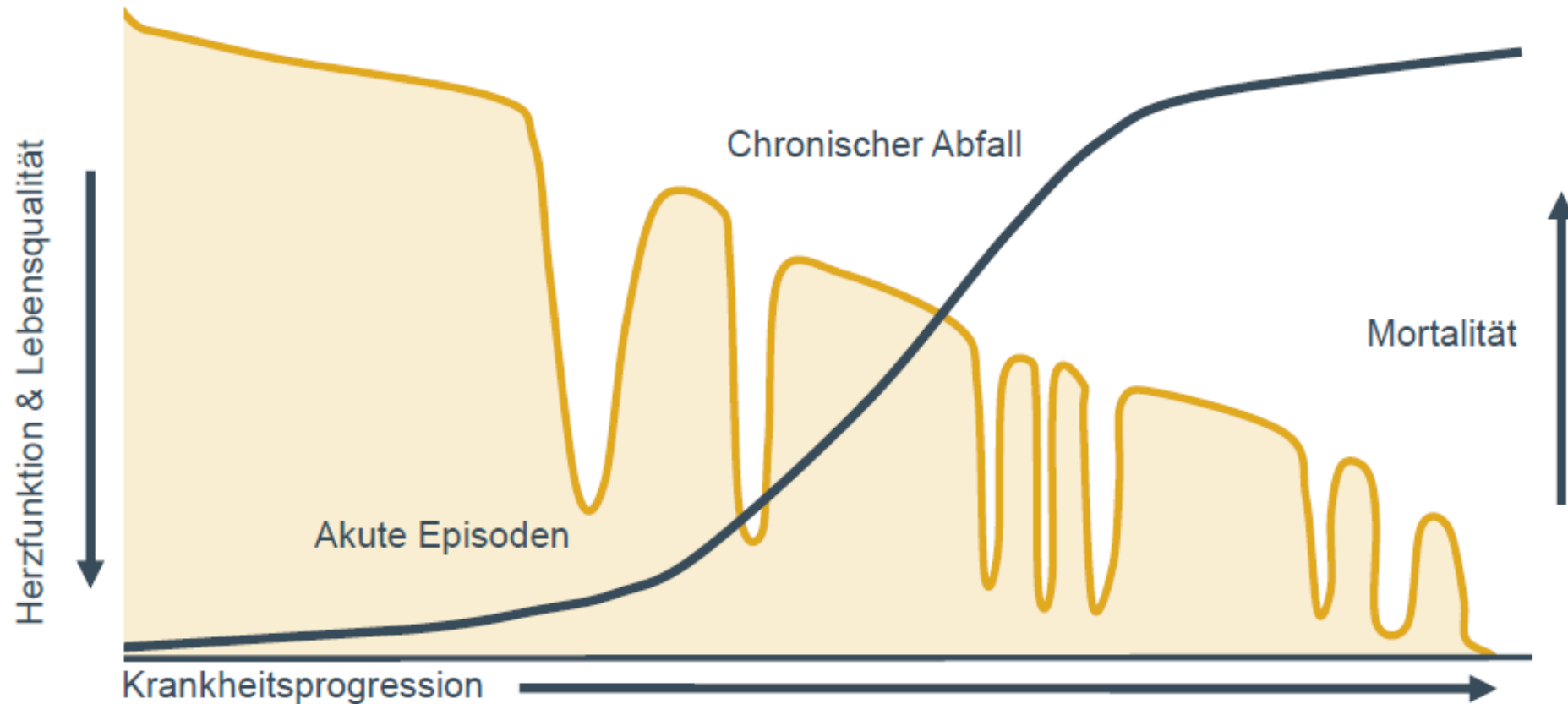
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- ✓ **Hard Facts about Heart Failure**
 - ✓ **Geschlechtsspezifische Unterschiede**
 - ✓ **Modernes Herzinsuffizienz Management**
-

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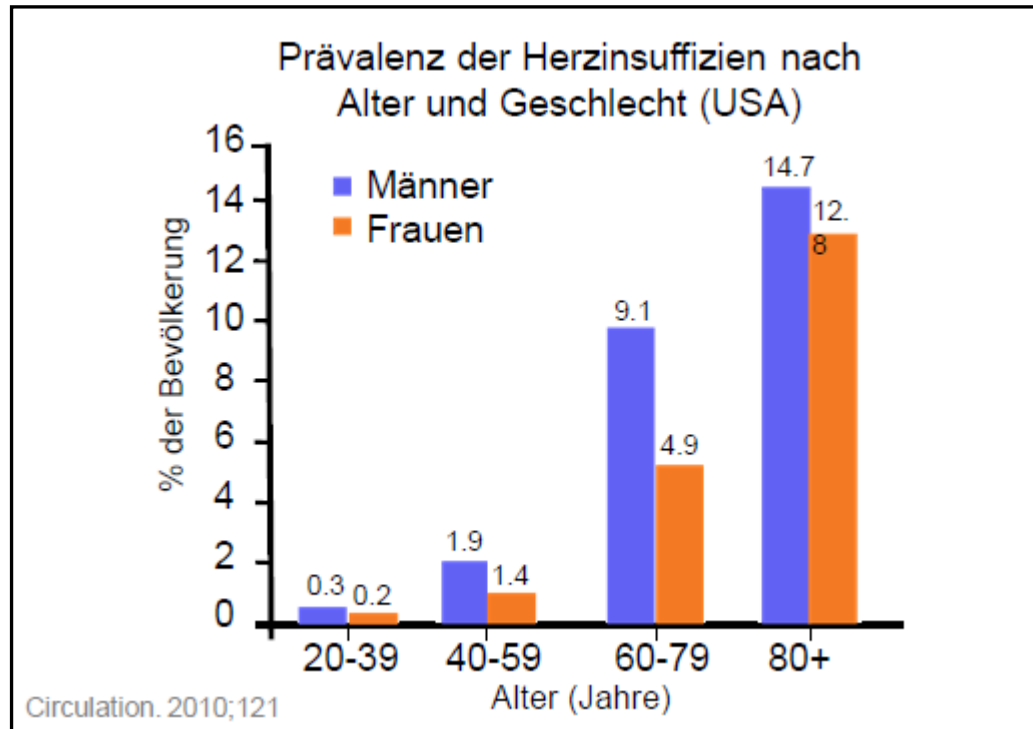


1. Chronisch, progressive Erkrankung!



2. Sehr häufig

- Ca. 1-2% der erwachsenen Bevölkerung leiden an Herzinsuffizienz
- Bei >70-jährigen leiden ca. 10% an HI



In Österreich: ~ 250.000 - 300.000
In der Steiermark: ~ 40.000

Welche Erkrankung fürchten die Menschen am meisten?

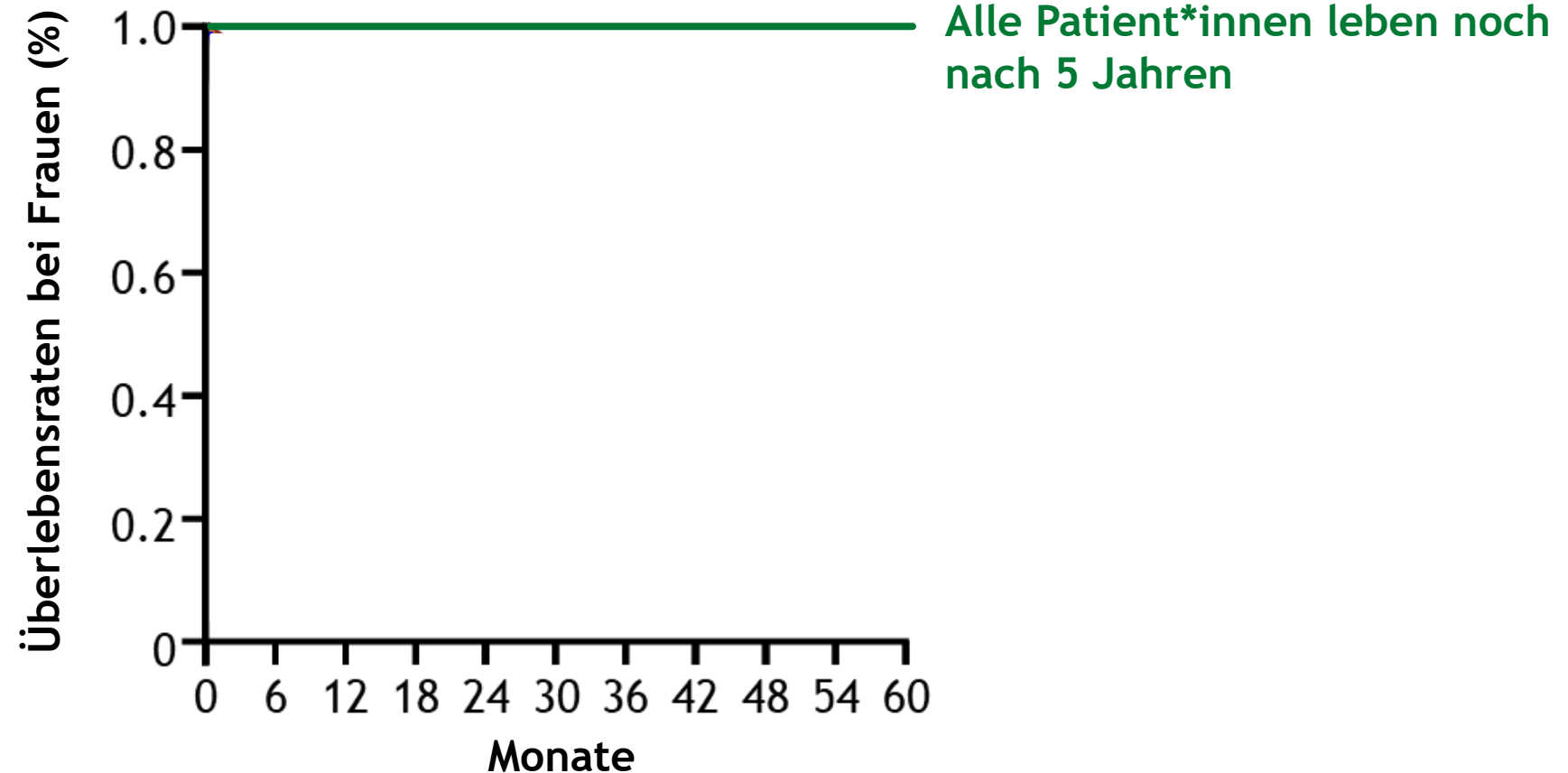
1. Demenz
2. Herzinsuffizienz
3. Krebs
4. Geschlechterkrankung
5. Diabetes

Insgesamt	14- bis 29-Jährige
<ol style="list-style-type: none"> 1. Krebs (69 Prozent) 2. Alzheimer / Demenz (49 Prozent) 3. Schlaganfall (45 Prozent) 4. Unfall mit Verletzungen (43 Prozent) 5. Herzinfarkt (38 Prozent) 6. Schwere Augenerkrankung (33 Prozent) 7. Psychische Erkrankung, wie Depression (30 Prozent) 8. Schwere Lungenerkrankung (21 Prozent) 9. Diabetes (16 Prozent) 10. Geschlechtskrankheit, wie z.B. Aids (11 Prozent) 	<ol style="list-style-type: none"> 1. Krebs (74 Prozent) 2. Unfall mit Verletzungen (45 Prozent) 3. Psychische Erkrankung, wie Depression (42 Prozent) 4. Schwere Augenerkrankung (40 Prozent) 5. Alzheimer / Demenz (40 Prozent) 6. Herzinfarkt (39 Prozent) 7. Schlaganfall (38 Prozent) 8. Geschlechtskrankheit, wie z.B. Aids (28 Prozent) 9. Schwere Lungenerkrankung (27 Prozent) 10. Diabetes (25 Prozent)

*Das Forsa-Institut führte für die DAK-Gesundheit vom 7. Oktober bis 1. November 2019 eine bundesweite und repräsentative Befragung von 2.814 Männern und Frauen durch

3. Schlechte Prognose!

Die Sterblichkeit bei **chron. Herzschwäche** ist höher als jene der meisten Krebsformen

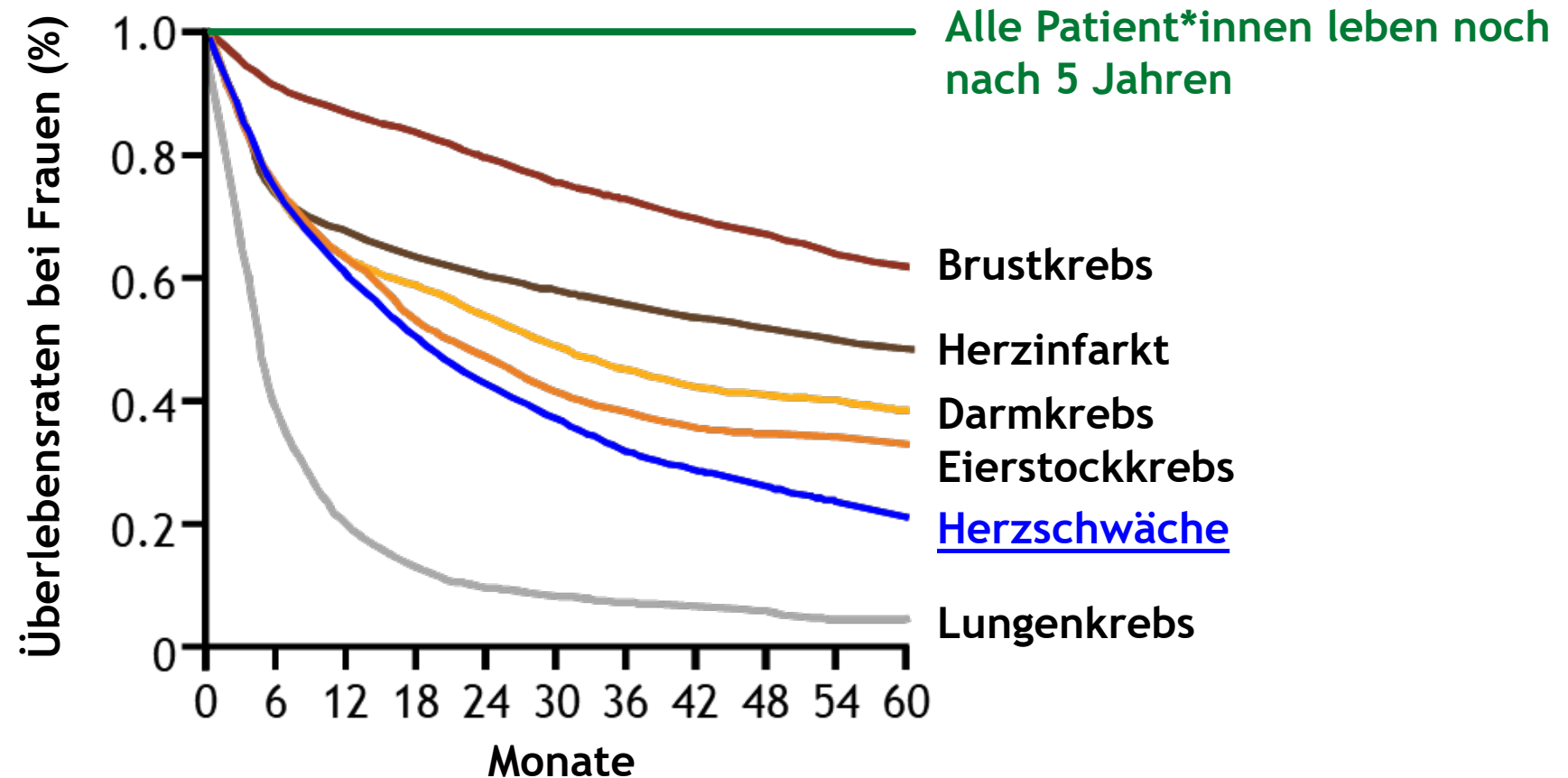


[1] Expertenstatement Herzinsuffizienz. Update Nr. 2/2011; ISSN 1726-0027

[2] Stewart S et al. Eurj Heart Fail 2001; 3:315-322

3. Schlechte Prognose!

Die Sterblichkeit bei **chron. Herzschwäche** ist höher als jene der meisten Krebsformen

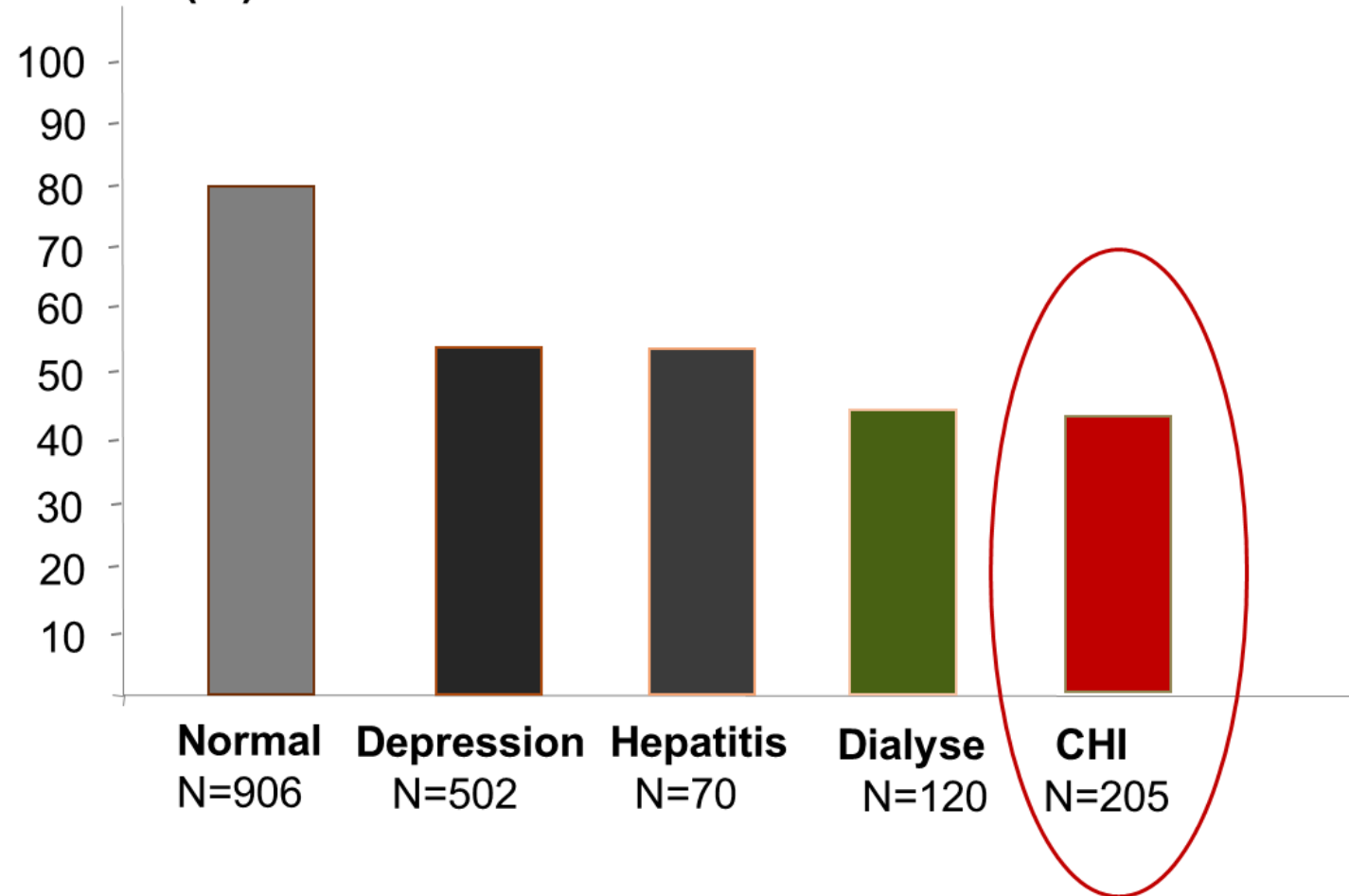


[1] Expertenstatement Herzinsuffizienz. Update Nr. 2/2011; ISSN 1726-0027

[2] Stewart S et al. Eurj Heart Fail 2001; 3:315-322

4. Schlechte Lebensqualität

SF-36 Score (%)



5. Kann jeden treffen

'Scarface Al' Capone Dies in Miami Villa From Heart Failure

Dead



Onetime Mobster Takes Last Ride To Funeral Home

Miami Beach, Jan. 25— (AP)— Scarface Al Capone, 48, gangland leader who feared a mobster's death, died tonight amid the luxury of his private villa with his family gathered around.

"I don't want to die, shot in the street," he once said.

When death came at 7:25 p. m., of pneumonia and heart failure, complications of an apoplectic stroke, he was in his own bed with expert medical care at hand—and behind him high protective walls that have long protected him from possible revenge.

Death came very suddenly of heart failure, said his physician, Dr. Kenneth S. Phillips, who has treated the prohibition era gang leader since he moved from New

York for brief trips, has lived under the Florida sun.

His villa is a 25-room structure on a lot 100 feet wide and 300 feet deep. A separate gate house, swimming pool and boat dock decorate it, all surrounded by a high wall through which the only entrance is a bared wooden gate. No visitor is admitted until a guard has looked him over through a peephole. Family members carry their own keys.

Born in Poverty

Federal prison records say Alphonse Capone was born in Naples, Italy, Jan. 17, 1899. He left the poverty-stricken home of immigrant parents to gravitate into gangdom on the streets of New York.

Capone went to Chicago in 1919 as a bodyguard for "Big Jim" Colosimo, a former street sweeper who liquor and politics had elevated to control of a southside vice district. When Colosimo was killed in his garish cafe, Johnny Torrio

Vol. 112, No. 198 Knoxville, Tennessee, Wednesday, August 17, 1957 24 Pages Two Sections

Elvis Presley Dies Of Heart Failure

By The Associated Press

MEMPHIS — Elvis Presley, the Memphis boy whose rock 'n' roll guitar and gyrating legs changed American music styles, died Tuesday afternoon of heart failure. He was 42.

Dr. Jerry Francisco, medical examiner for Shelby County, said the cause of death was "cardiac arrhythmia," an irregular heartbeat. He said "that's just another name for a form of heart attack."

Francisco said the three-hour autopsy revealed no sign of any other disease, and there was no sign of any drug abuse.

Presley was declared dead at 3:30 p.m. (4:30 p.m. EDT) at Baptist Hospital, where he had been taken by a fire department ambulance after being found unconscious at his Graceland mansion.

Dr. George Nickopoulos, Presley's personal physician, said Presley was last seen alive shortly after 9 a.m. Nickopoulos said Presley had been taking a number of appetite depressants, but he said they did not seem likely to his death.

Presley's unconscious fate was discovered at his white-colored mansion by Joe Esposito, his road manager. A girl friend, Ginger Alden, 30, was at the mansion, Nickopoulos said.

A Baptist Hospital spokesman said Esposito began resuscitation efforts and called for Nickopoulos and an ambulance.

Nickopoulos halted resuscitation attempts at about 3:30 p.m. (4:30 p.m. EDT), according to the hospital.

Presley had been a frequent patient at the hospital over the past few years.

Earlier this year, he cancelled several performances in Louisiana and returned to Memphis where he was hospitalized.

He performed with shined back hair, sideburns and a pompadour.

Presley went free driving a truck to driving the girls crazy in the mid 1950s. They screamed, jumped and hollered as Elvis gyrated about the stage in sequined, skin-tight outfits.

Frank Sinatra had had that impact on females a decade before, but with a different style. He was also did and the Beatles came along almost a decade later.

He once asked his mother: "Momma, you think when you're on the stage?"

Elvis said his mother replied: "You're not onstage, but you're girls'!" "So reach into your single! Keep that up, you won't live to be 30!"

Elvis Aron Presley was born in a two-room house in Tupelo, Miss., on Jan. 8, 1935. During his prime in the 1950s, he carried about 175 pounds on his slender frame but in recent years was reduced to 160 pounds.

He had more than 30 gold records — million-sellers. His popularity peaked with a movie career, too, and he appeared on the Ed Sullivan show in the 1950s, fears about his sexuality seemed so overt that he was shown only from the waist up.

"Everytime I leave on television, they write that I'm obscene," Presley once said. "I've seen a lot worse movie-kicks than mine every night on TV. Look at all that medium dancing. If I do these movements, they'd want to teach me. Yet I never did anything, only being modern-minded."

His shake, rattle and roll showmanship — with such hit singles as "You Are A Natural Born A Heart Dog," "Heartbreak Hotel," "Blue Suede Shoes" and "Love Me Tender," kept teenage girls gushing.

— and an invitation to purchase autographed photos of the singing star.

The fact alone to sell one million copies was an Elvis Presley record. Even more astounding was the fact that the single record was reached in only six months.

Although only half of Elvis was shown for the first full appearance in 1956, the show was watched on a single network by more people than President Eisenhower drew when he made his acceptance speech on three networks.

A television rating service gave Elvis 83.4 per cent of the nation's TV audience in 1956 per cent for Eisenhower's speech.

His career was interrupted in 1958 when Presley was drafted for a two-year hitch in the Army. It was written in 1960 that, upon his discharge, Elvis talked about girls only half of the later period of his fame.

Mr. David Lips, as he was then called at the time, said that if there was one thing the Army had taught him it was that "you can't please everybody."

Presley stuck to singing, the movies and lucrative appearances in Las Vegas, shying away from television after he made it big. He said television restricted him.

"The music business was and that's why I jump as I do. They got the camera on my face for a close-up. Anyone who sees me on television isn't giving their money's worth because they are in prison."

Earlier this year, there were speculation rumors that Sam Cooke, Presley's business manager, had 10 years would have been his. The rumors were quickly denied.

The marriage showed its eight-year duration that began when Presley was drafted with the Army in Germany. They were divorced in 1957. They had a daughter, Lisa Marie, who was born and died in the custody of her mother. Presley's last two government marriages, and a court

GIVE, ST. LOUIS— IT'S YOUR RED CROSS

St. Louis Globe-Democrat.

Over One Hundred Years Old This Year

Vol. 78—No. 268—Section A St. Louis, Friday Morning, March 6, 1933—2 Sections—30 Pages FIVE CENTS

STALIN DIES FROM HEART FAILURE

For Quicker WANT AD RESULTS Dial GA. 1212 The Result Number

6. Geschlechtsspezifische Unterschiede

HERZINSUFFIZIENZ

**Wir müssen das
Bewusstsein für
Herzinsuffizienz
schärfen**

<https://lnkd.in/eytcx6XT>



Symptoms and/or signs of HF caused by a structural and/or functional cardiac abnormality



- EF < 50%
- LV Dilatation
- LVH
- ≥ moderate Klappenvitien
- E/e' ≥ 14

and corroborated by *at least one* of the following



Elevated natriuretic peptide levels



- NT-proBNP (pg/ml) ≥ 125 bzw. ≥ 300

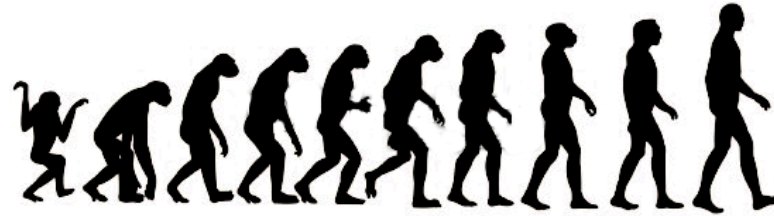
or

Objective evidence of cardiogenic pulmonary or systemic congestion



- Thorax Röntgen
- USKG (rest/provocation)
- PCWP (rest/provocation)

Figure 1. Universal definition of HF.



- Pre-1980s** **Nicht-pharmakologische Ära:** Bettruhe & Salz-/Flüssigkeitsrestriktion
- 1980s-1990s** **Pharmakologische Ära:**
- ✓ Früh: Digitalis, Diuretika & Vasodilatoren
 - ✓ Spät: Neurohumorale Signalwege entdeckt
(ACE inhibitors, β -blockers, MRA)
- 2000s -** **Device Ära:** ICDs, CRTs, LVADs, Hämodynamisches Monitoring

Fortschritt



ACEi / ARB / BB / MRA / ARB / ARNI / SGLT2i / GLP1RA

Gender equality?



women earn
16%
LESS THAN MEN
on average

Gender
pension gap
39%



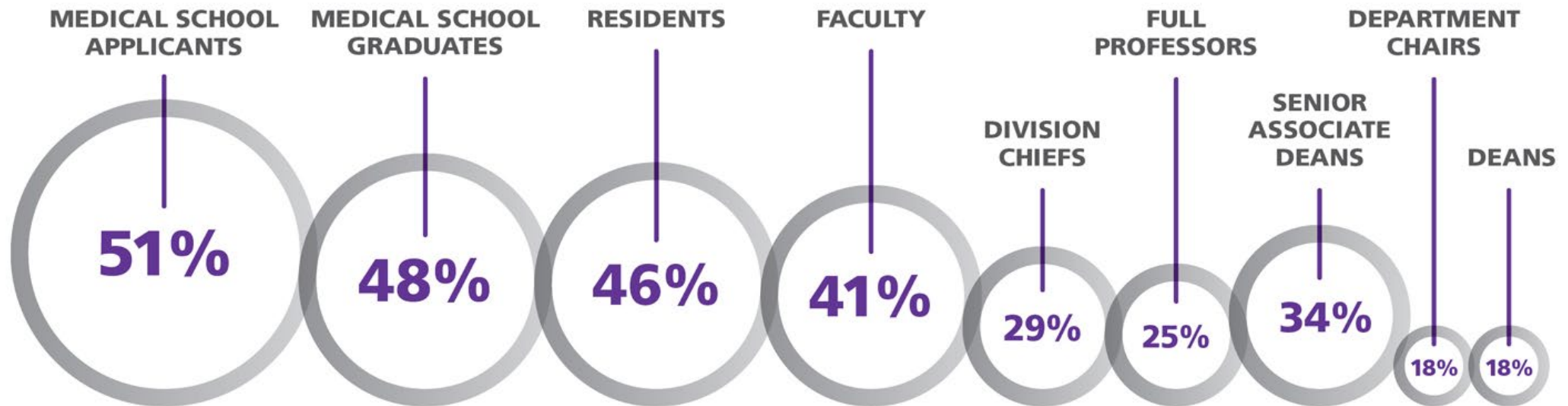
ONE
out
of 
THREE
women
experienced at
least one form
of sexist or
sexual violence
in the past
twelve months

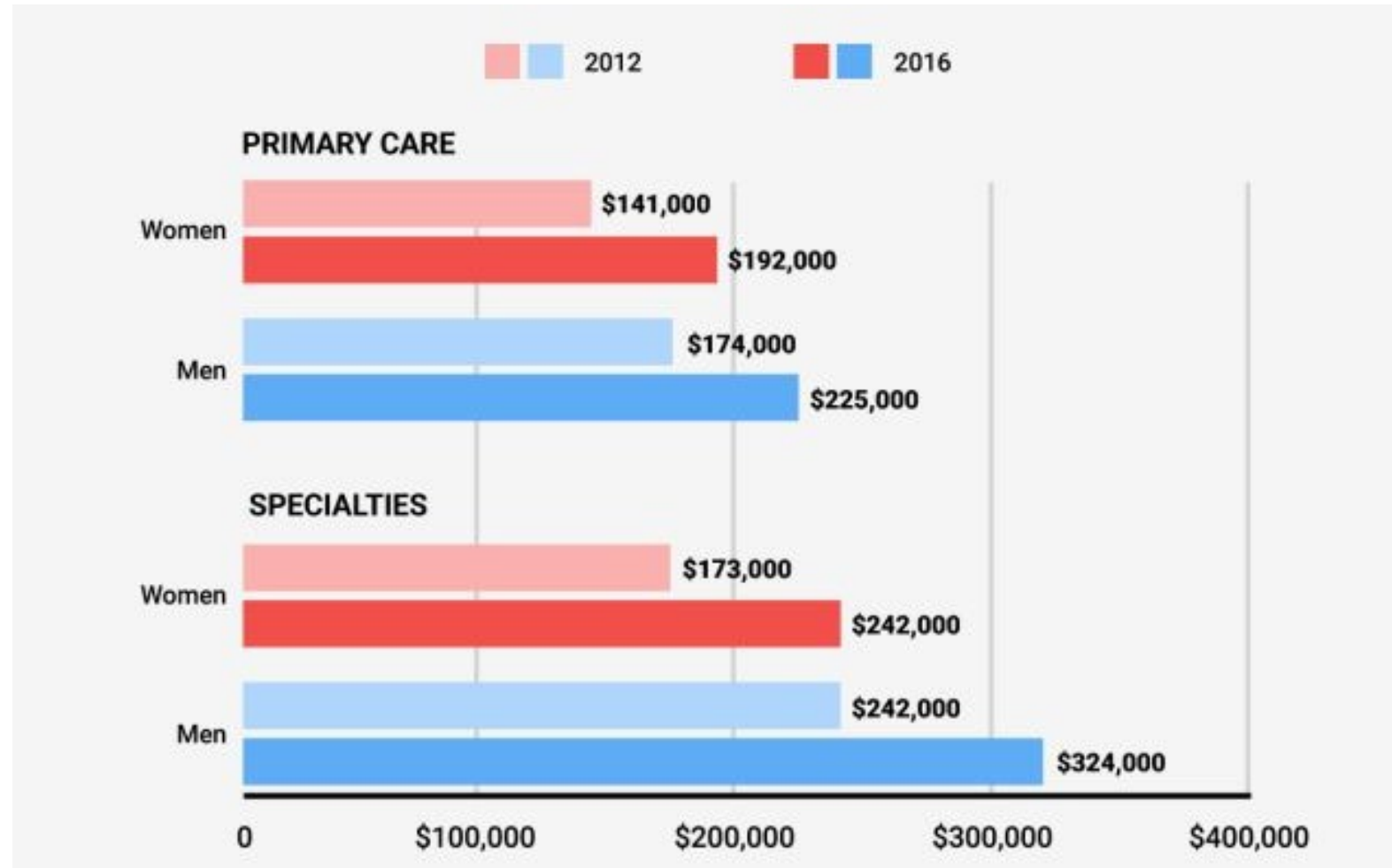
85%
of mayors
are men


women live
longer but in
poorer health

56%
total proportion
of women victim of
street harassment
at least once
in their life

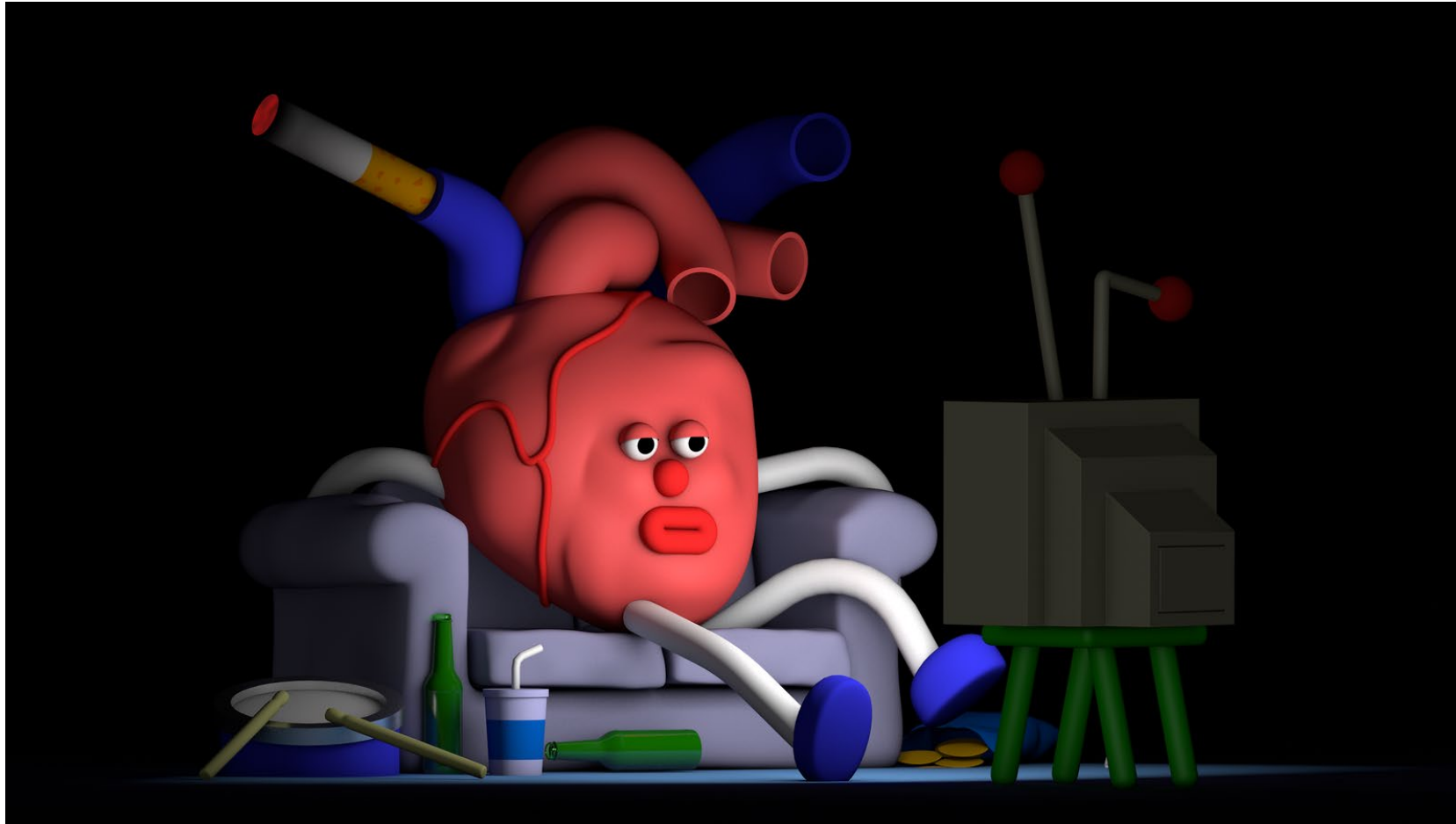
REPRESENTATION OF WOMEN IN ACADEMIC MEDICINE 2018-2019





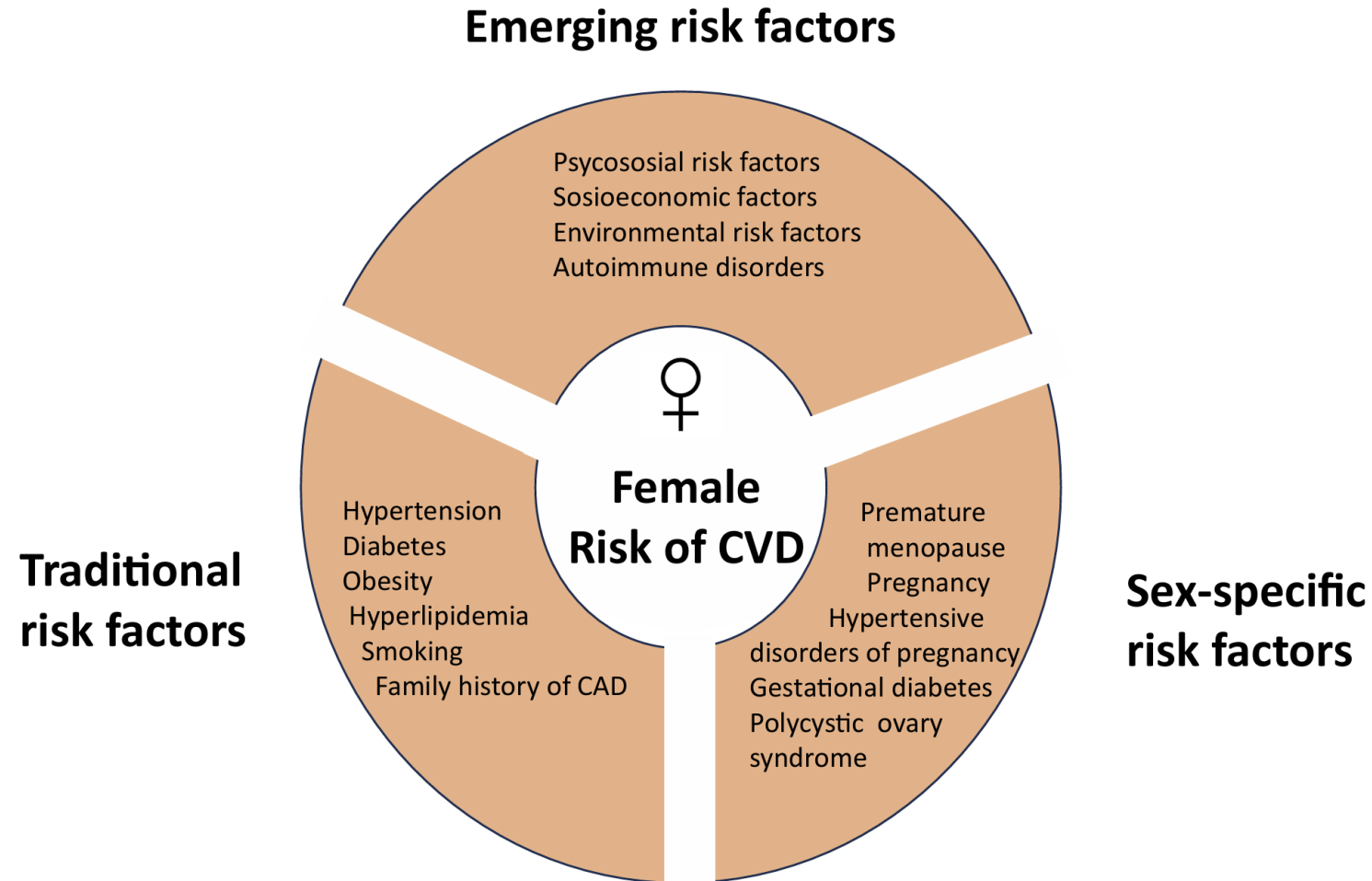


- ✓ **Risikofaktoren und Komorbiditäten**
- ✓ **Klinik und EF**
- ✓ **Pharmakodynamik/Pharmakokinetik**
- ✓ **Therapieansprechen**
- ✓ **Nebenwirkungen**
- ✓ **Prognose**



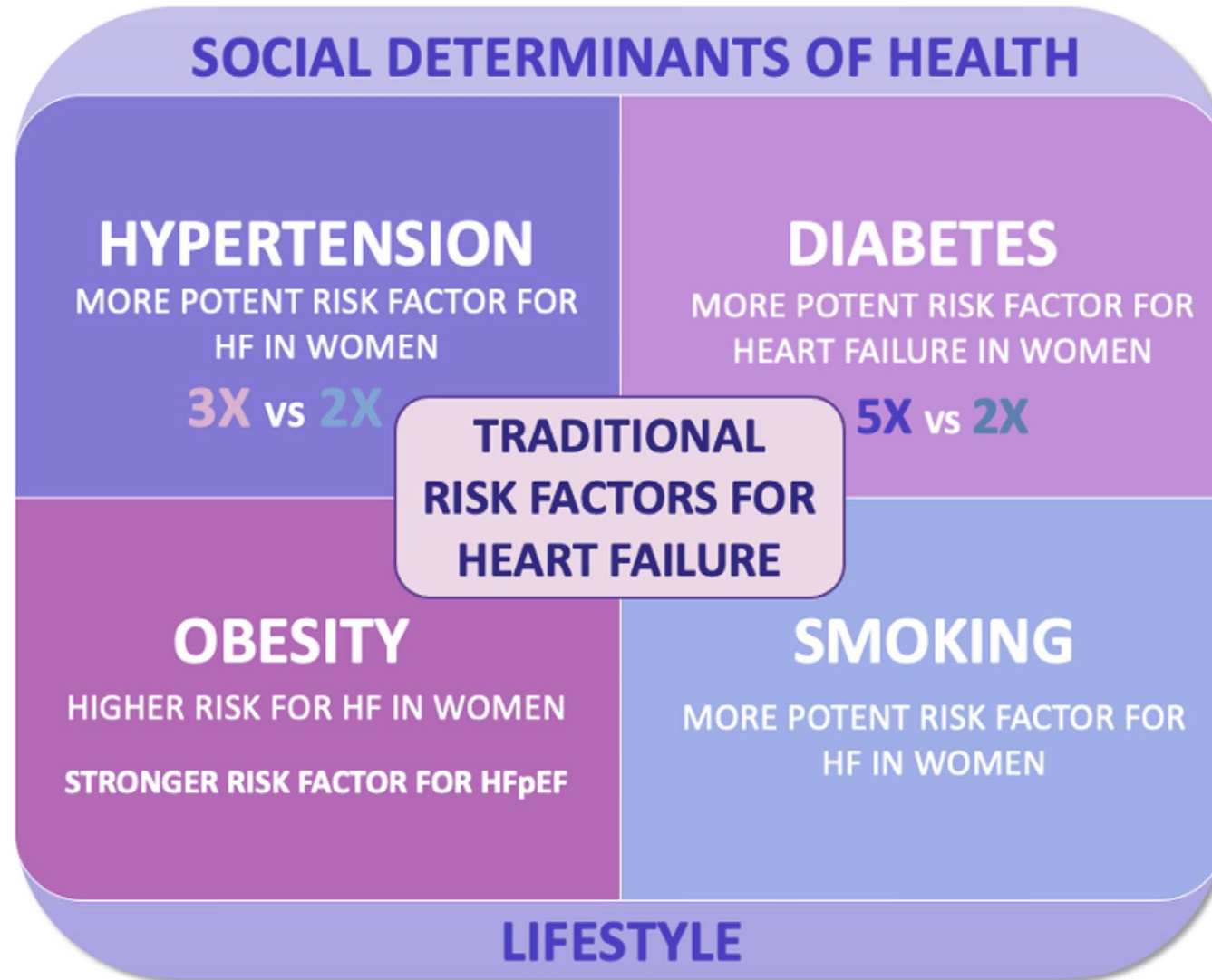
Risikofaktoren/Komorbiditäten

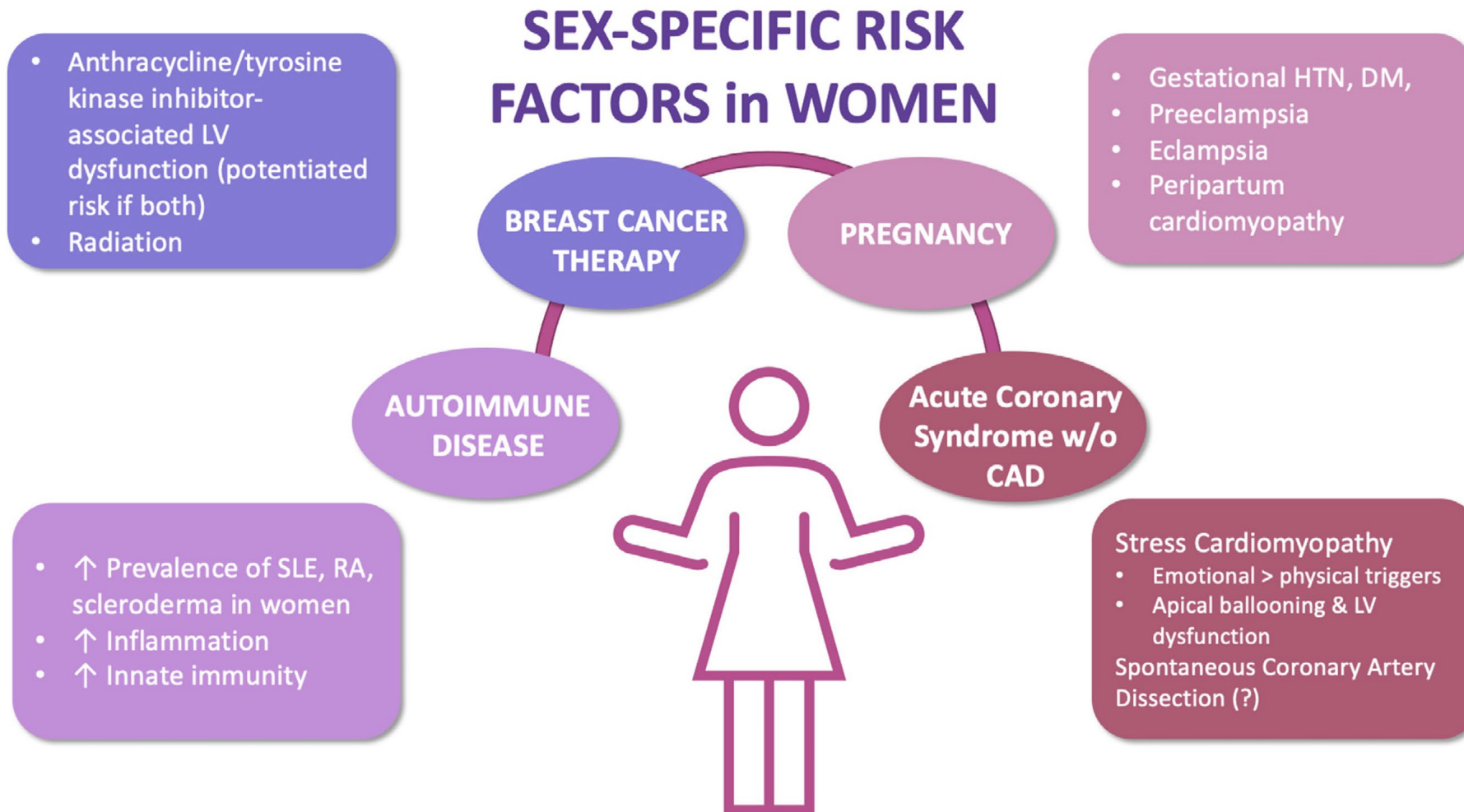
**Geschlechtsspezifische Unterschiede in der Häufigkeit und Auswirkung
bei Herzinsuffizienz**



Marriage has been demonstrated to confer a cardiovascular benefit to men but not specifically to women

Risikofaktoren: unterschiedlicher Einfluss





- ✓ reversible LV-Dysfunktion mit Ausbuchtung des LV-Apex (apical ballooning)
- ✓ Tako-Tsubo betrifft v.a. Frauen jenseits des 60. LJ
- ✓ Auslöser: Emotionaler Stress (von “banal“ bis existenzbedrohend)

✓ Klinik

- Infarkttypische Schmerzen

✓ EKG

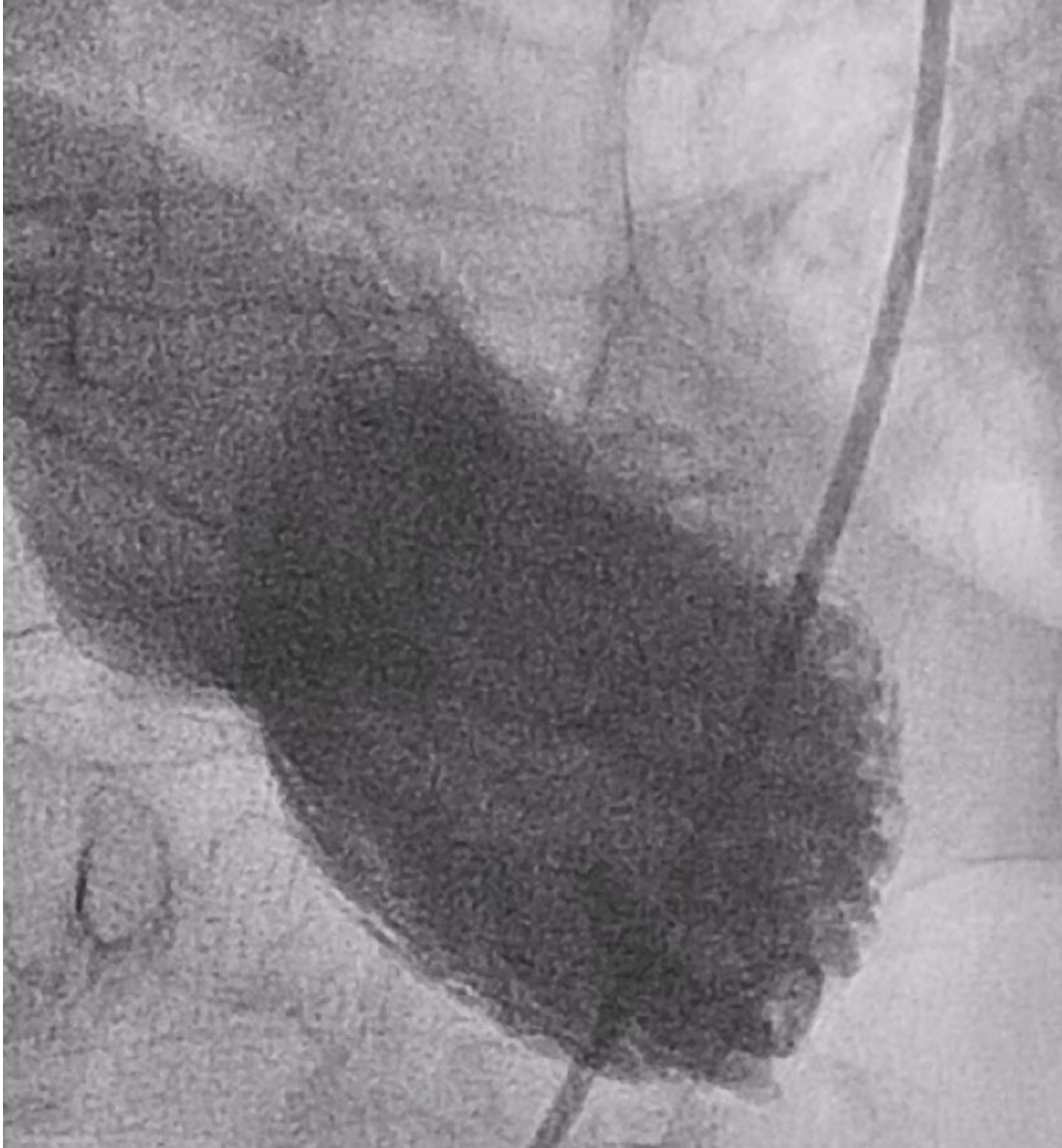
- ST-Streckenhebung über der Vorderwand

✓ Echokardiographie

- Ausbuchtung des apikalen Myokards bei hyperkontraktiler Basis

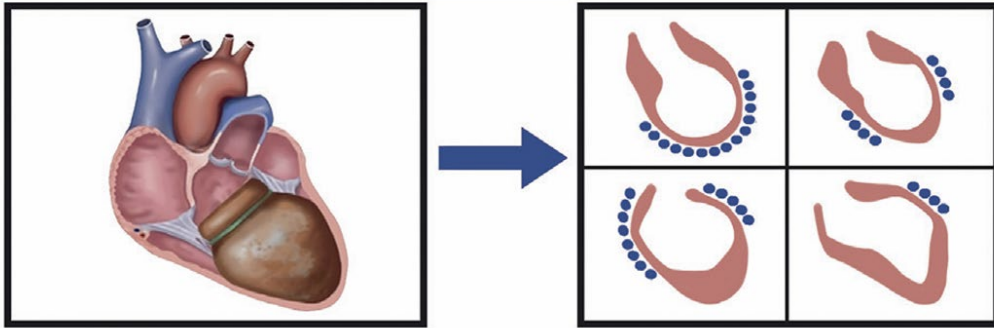
✓ Koronar-Angiographie

- Unauffällige Gefäße
-

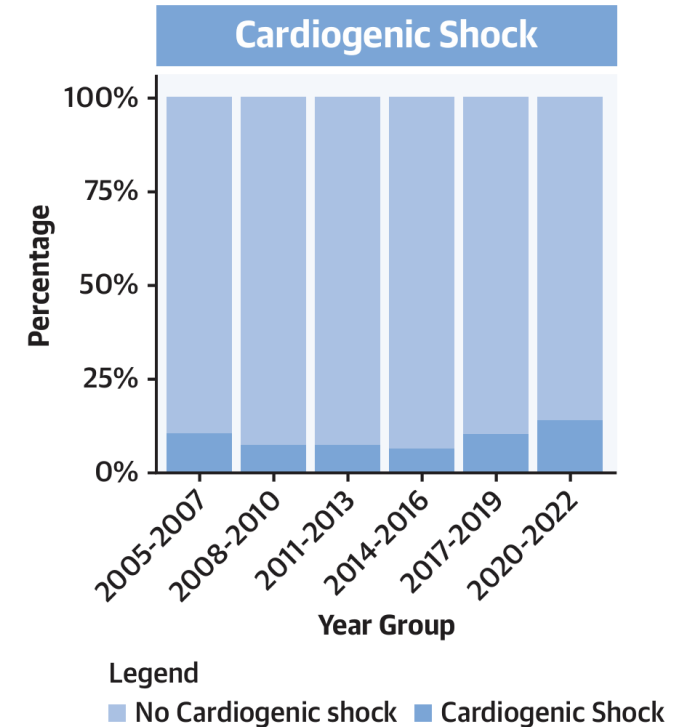
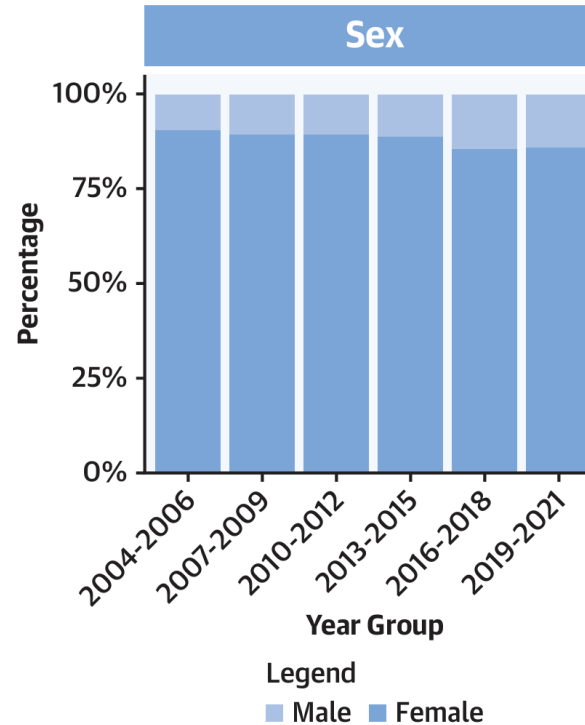
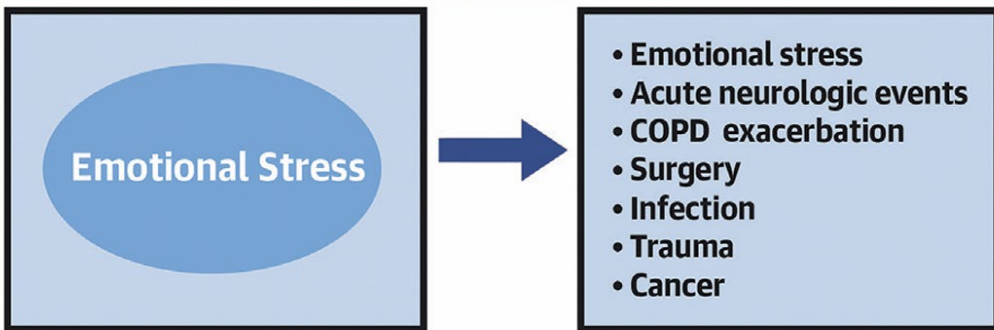


Temporal Trends - Intern. Takotsubo Registry

Defining Diverse Morphological Types



Physical Triggers Took Precedence Over Emotional Ones



✓ Therapie

- Betablocker
- ACE-Hemmer

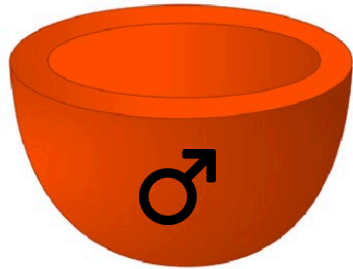
✓ Prognose

- Meisten Fällen gut, völlige Normalisierung nach einigen Wochen;

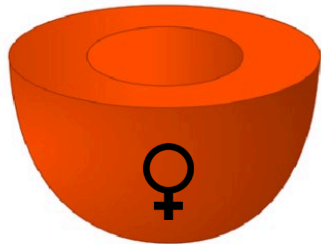
Katecholamine sind der Auslöser der Erkrankung und sollten nach Möglichkeit vermieden werden!

Unterschiede: Klinik & EF

- ✓ Frauen stärker Symptome und höheren Leidensdruck
- ✓ Höhere NYHA Klassen und höhere NTproBNP Werte













Eccentric hypertrophy



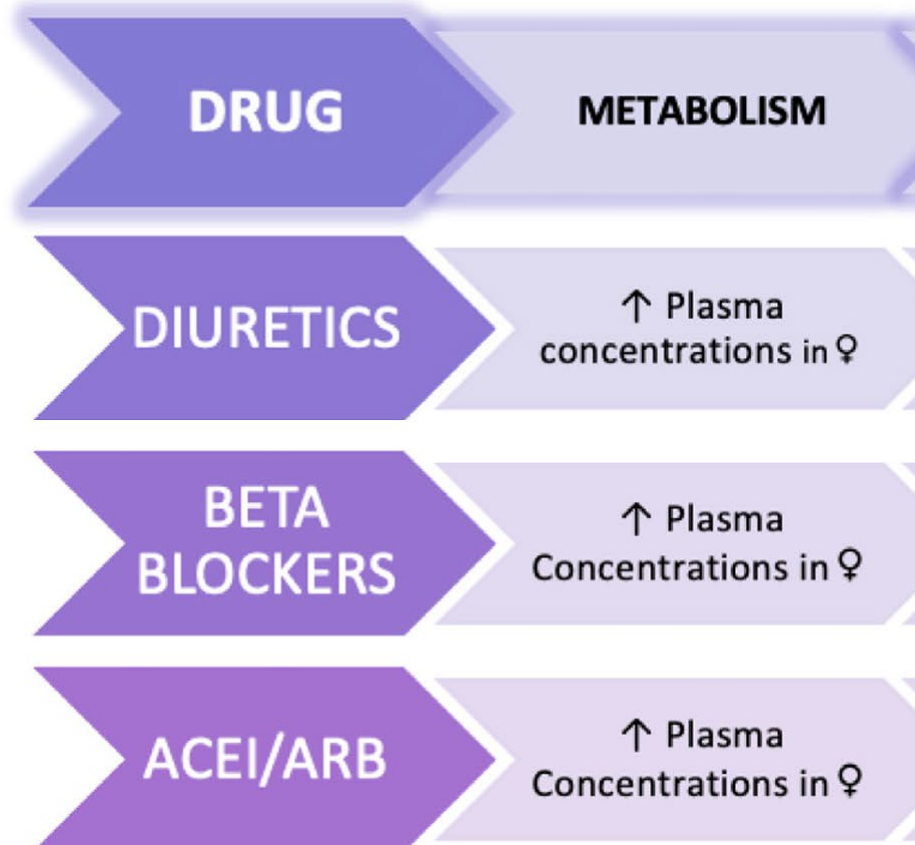
Concentric hypertrophy

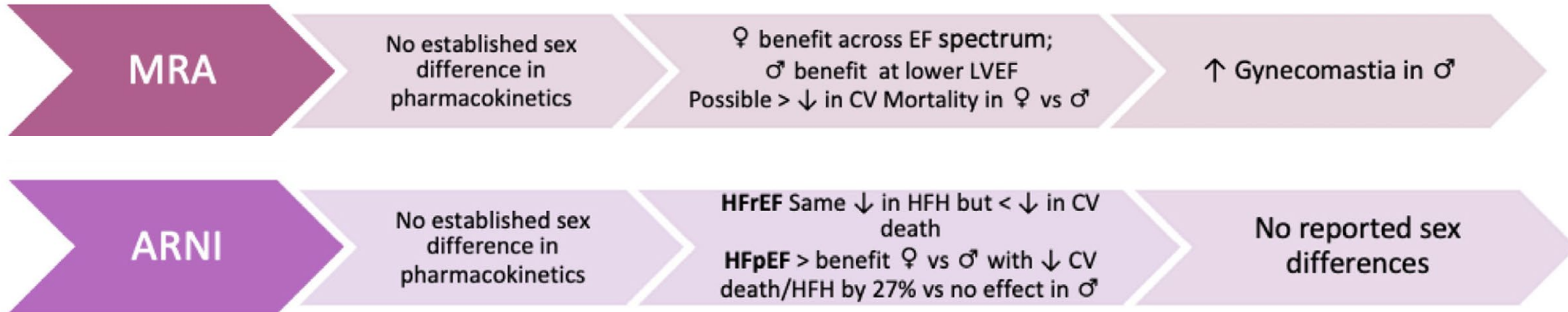
- ✓ Frauen höher EF; EF von 50% größere Reduktion als beim Mann
- ✓ Hypothese warum HI Medikamente bei Frauen auch in höheren EF Klassen noch wirken vs Männer
- ✓ Frauen besseres reverses remodelling (NTproBNP ↓ / ↑ EF)

Pharmakodynamik und -kinetik

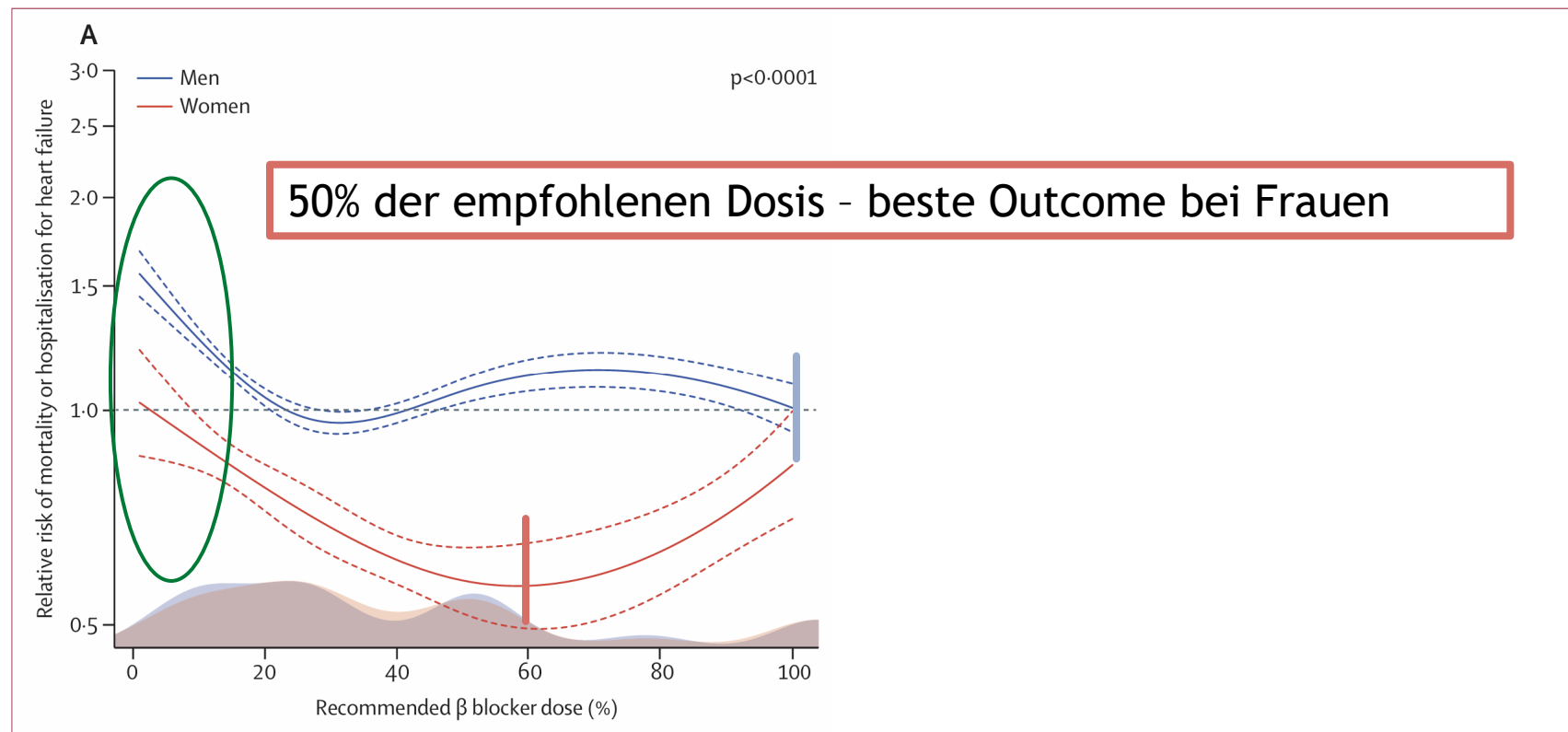
Parameter	Physiologic Differences	Pharmacokinetic Impact
ABSORPTION <ul style="list-style-type: none"> • Intestinal Transit Times • Transdermal Absorption 	 	<p>Slower Intestinal Transit in Women</p> <p>↑ Transdermal Absorption in Women</p>
DISTRIBUTION <ul style="list-style-type: none"> • Total Body Water • Women Greater Adipose Tissue • Plasma proteins modulated by Estrogen 	  	<p>↑ Total Body Water in Pregnant Women & Men</p> <p>↑ Adiposity in Women</p> <p>↑ Free Concentrations in Women (modulated by estrogen)</p>
METABOLISM <ul style="list-style-type: none"> • Organ Blood Flow • Cardiac Output • Body Fat 	  	<p>↓ Hepatic Blood Flow in Women</p> <p>↑ Cardiac Output/ Rate of Distribution in Men vs Women</p> <p>↑ Body Burden of Lipid Soluble Drugs in Women</p>
ELIMINATION <ul style="list-style-type: none"> • Renal Excretion • Liver Metabolism 	 	<p>↑ Glomerular Filtration Rate, Tubular Secretion & Resorption in Men</p> <p>↑ Renal Blood Flow in Pregnancy by 50%</p> <p>↓ Liver Enzyme Activity in presence of Estrogen: metabolism varies through pregnancy, menstrual cycle, use of contraceptives, after menopause in women</p>

Ansprechen auf Medikamente





- ✓ 11 Länder, prospektive Beobachtungsstudie; chron. Herzinsuffizienz (2010-2012)
- ✓ Suboptimale Dosierung von ARB/ACEi und B Blocker ($\leq 50\%$ der Zieldosis)



- ✓ B-blocker, ARB, ACEi - selbe Dosis führt zu 2.5x höhere Plasmaspiegel bei Frauen
- ✓ B Blocker: HF und Blutdruck stärker gesenkt bei Frauen mit gleicher Dosierung
- ✓ 50-70% höheres Risiko für Nebenwirkungen
- ✓ Häufig schwerer Nebenwirkungen in Frauen vs Männer
- ✓ Absetzen von Medikamenten, welche Prognose verbessern

Digitalis - DIG Trial (1997)

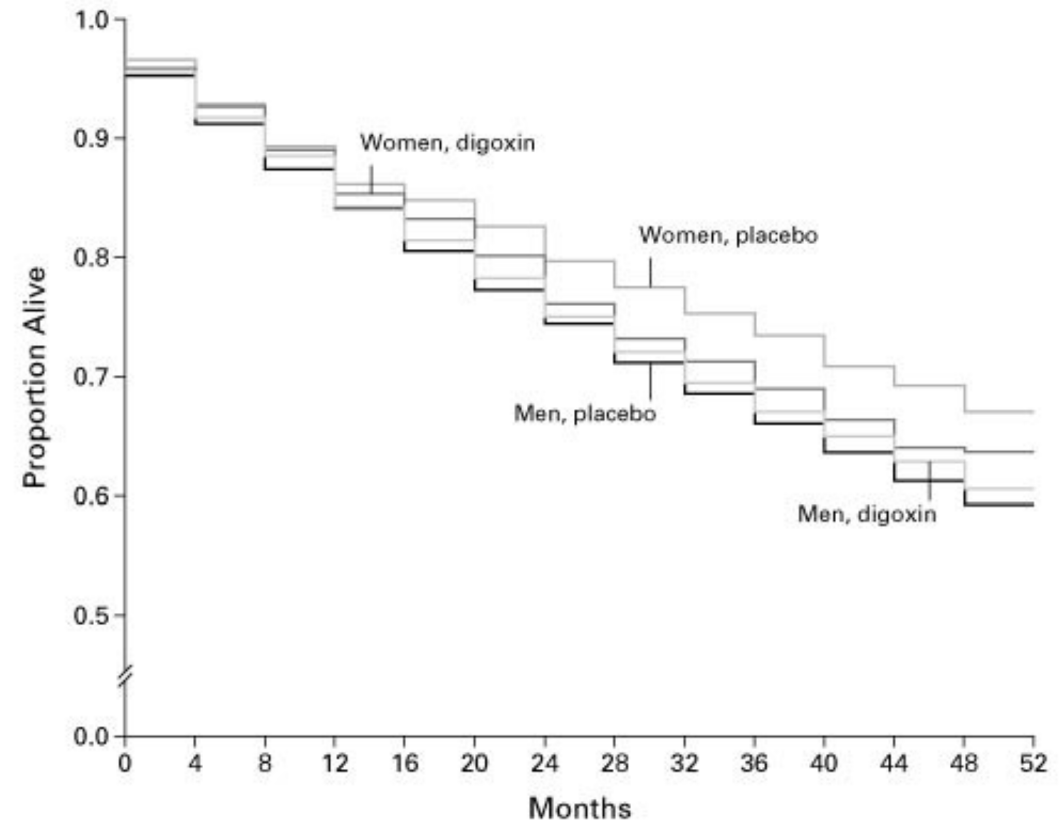
- ✓ EF < 45%
- ✓ Digitalis vs Placebo
- ✓ n=6800

INTERACTION BETWEEN SEX AND DIGOXIN THERAPY

SEX-BASED DIFFERENCES IN THE EFFECT OF DIGOXIN FOR THE TREATMENT OF HEART FAILURE

SAIF S. RATHORE, M.P.H., YONGFEI WANG, M.S., AND HARLAN M. KRUMHOLZ, M.D.

	Männer	Frauen
Dosierung	0.0093 mg	0.0084 mg
Plasmaspiegel	0.8 ng/mL	0.9 ng/mL



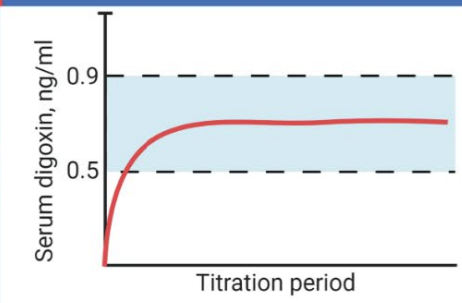

Digitalis assoziiert mit erhöhtem Mortalitätsrisikos bei Frauen, nicht bei Männern

DECISION Trial - low dose Digoxin in HF

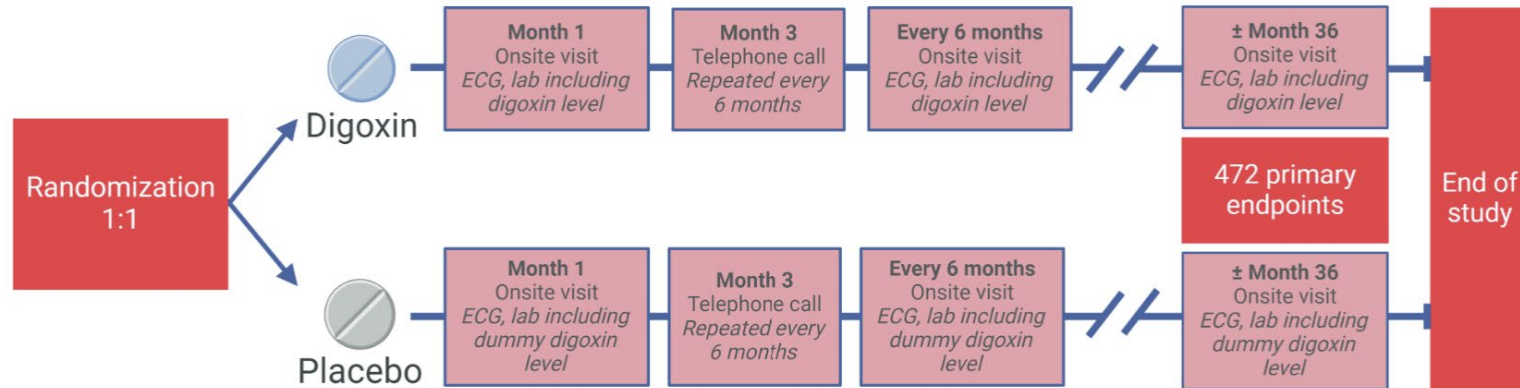
Digoxin Evaluation in Chronic heart failure: Investigational Study In Outpatients in the Netherlands:

DECISION

Double-blind, randomized, placebo controlled, multicenter trial

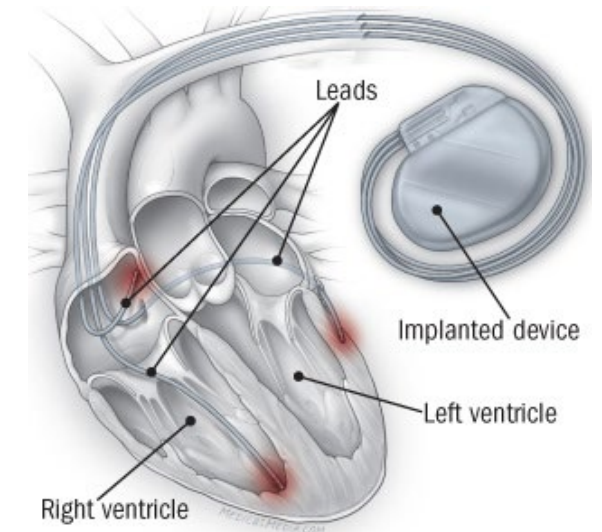
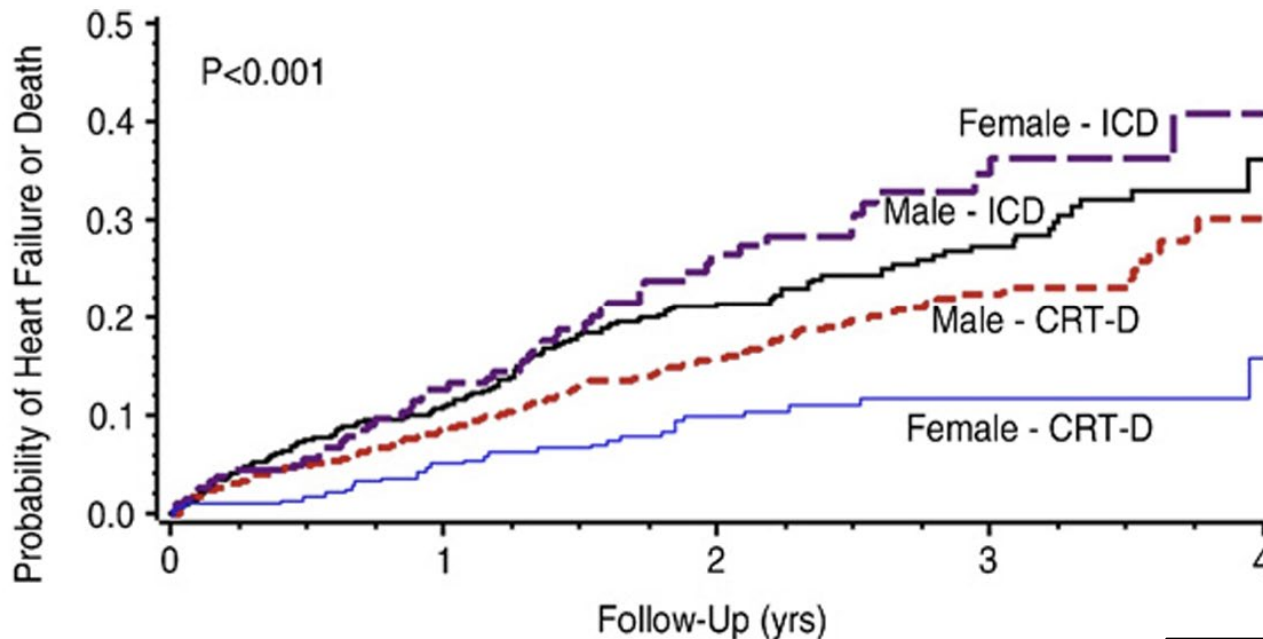
Main inclusion criteria	Digoxin concentration, target dose	Primary outcomes
<ul style="list-style-type: none"> Chronic HF NYHA class II-IV LVEF <50% NT-proBNP: <ul style="list-style-type: none"> ≥ 600pg/ml if sinus rhythm ≥ 1000pg/ml if atrial fibrillation <p>1002 patients 43 participating Dutch sites</p>	 <p>Serum digoxin, ng/ml</p> <p>Titration period</p>	 <p>Cardiovascular death + heart failure hospitalization / urgent hospital visit (recurrent event analysis)</p>

Study design



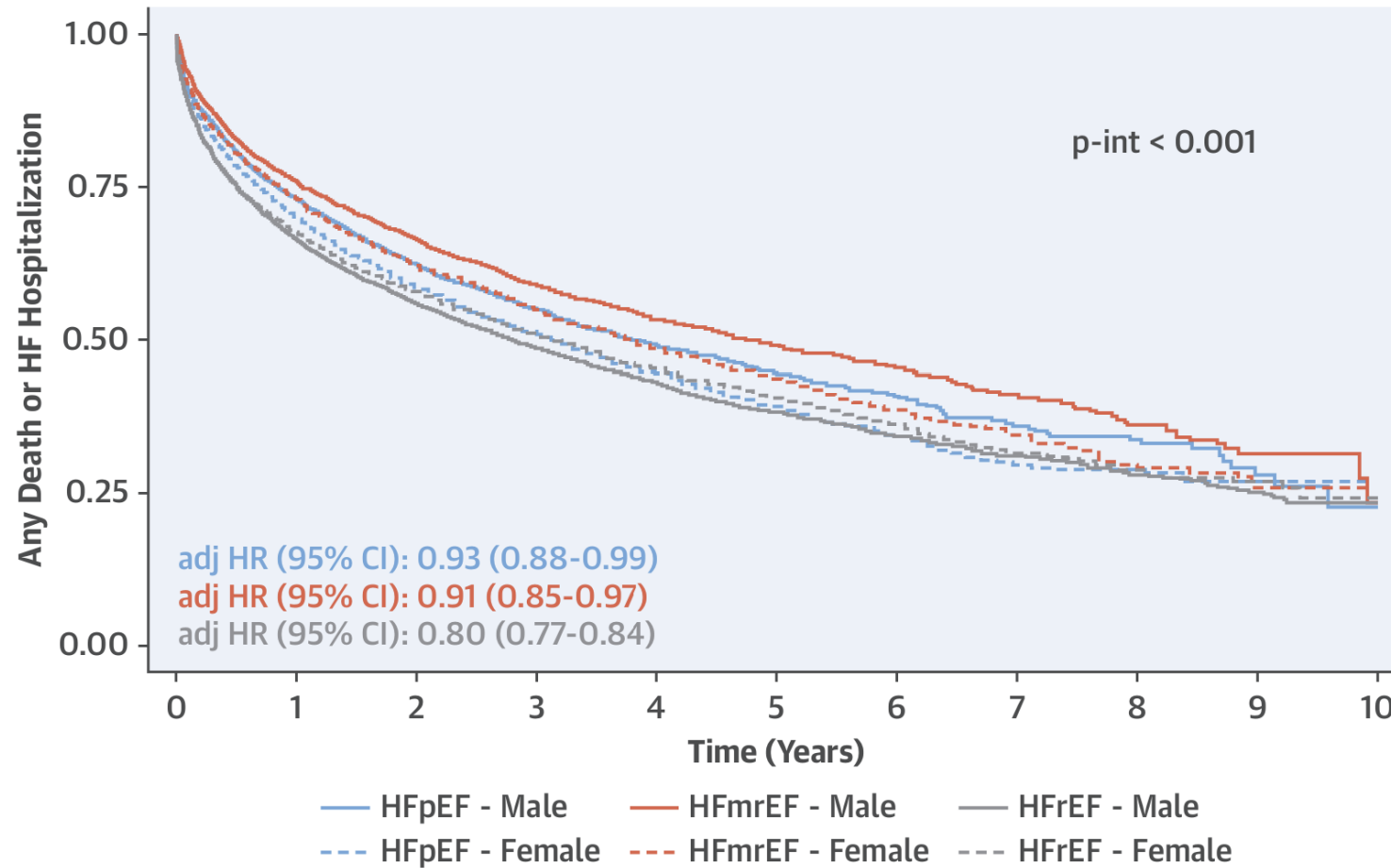
Devices - MADIT CRT Studie

- ✓ bei symptomatischer HI und hochgradig eingeschränkter LV-EF (<35%)
- ✓ zumindest 3-monatiger optimaler medikamentöser Therapie
- ✓ Verbreiterung des QRS-Komplexes >130msec



Guidelines selben Kriterien
Frauen bekommen seltener eine CRT

Any Death or HF Hospitalization



- ✓ Risikofaktoren wirken sich unterschiedlich auf Frauen aus
- ✓ Frauen schwerer Symptome und häufiger HFpEF
- ✓ HFrEF: Fantastic 4 wirken bei Frauen und Männer gleich
- ✓ HFpEF: ARNI und Spironolacton eventuell besser Wirkung in Frauen
- ✓ Therapien (Medikamente, Devices) werden bei Frauen zu selten verwendet
- ✓ Optimale RAASi und B Blocker Dosierung bei Frauen niedriger (50%)

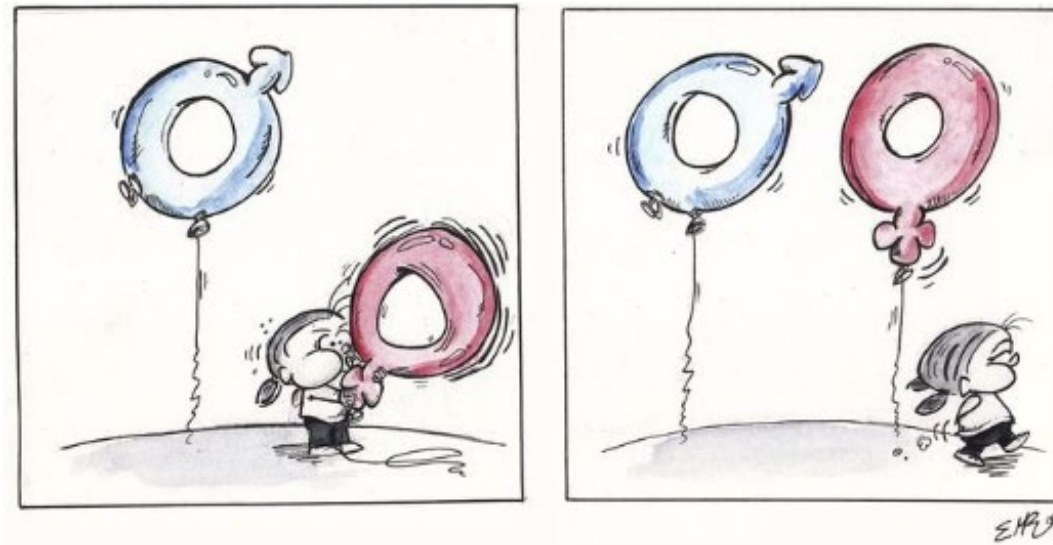


- ✓ Symptome
- ✓ Lebensqualität
- ✓ Therapieansprechen
- ✓ Prognose

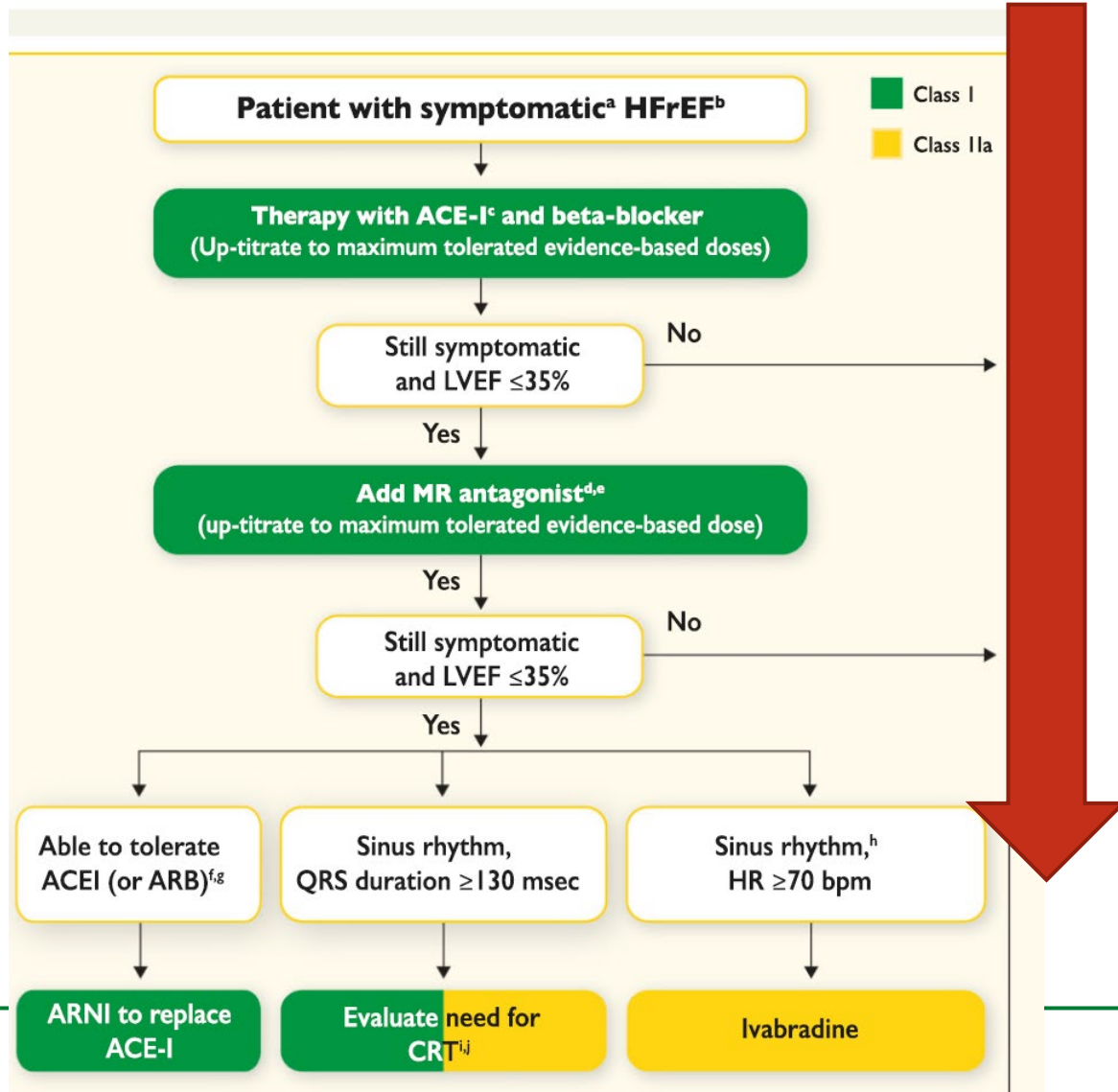
**Internationale Guidelines machen
keinen Unterschied in der
Behandlung zwischen Frau/Mann**

Es braucht mehr Frauen

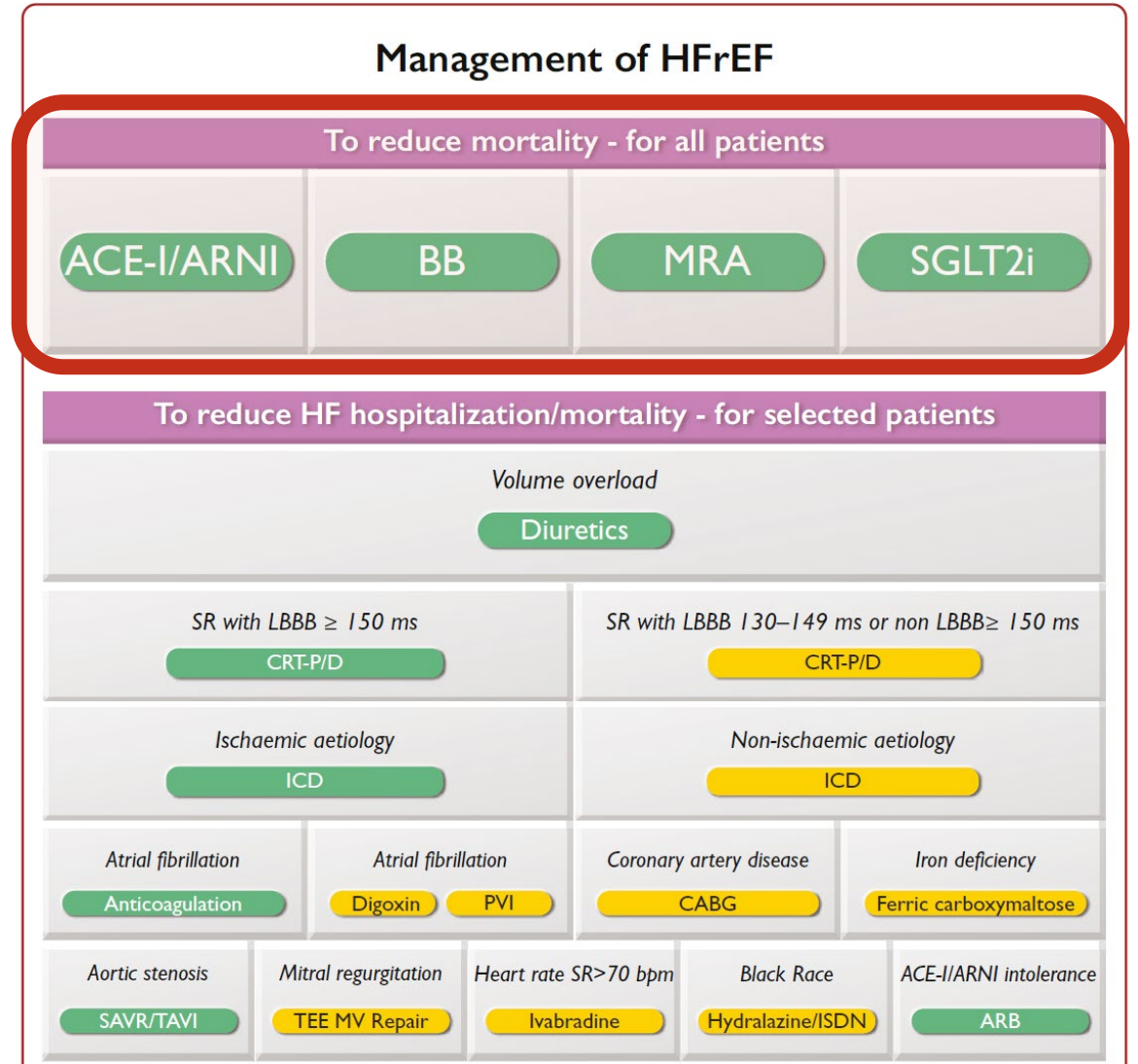
- in Studien: geschlechtsspezifische Unterschiede analysieren
- als Studienleiterinnen
- als Journal editors
- als Entscheidungsträger (EMA, FDA)



2016



2021



Kampf gegen Herzinsuffizienz

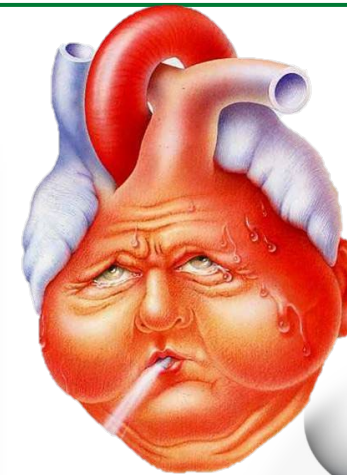
ACEi/ARNI

SGLT2i

FANTASTIC 4

MRA

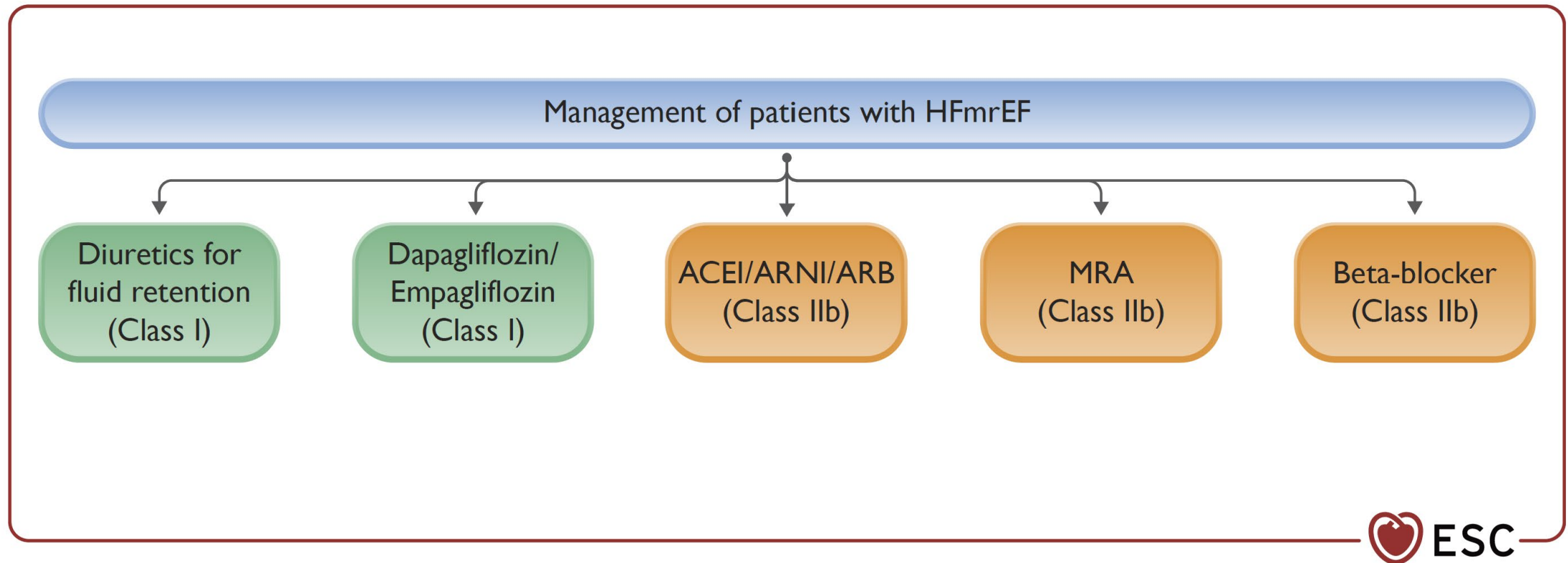
BB



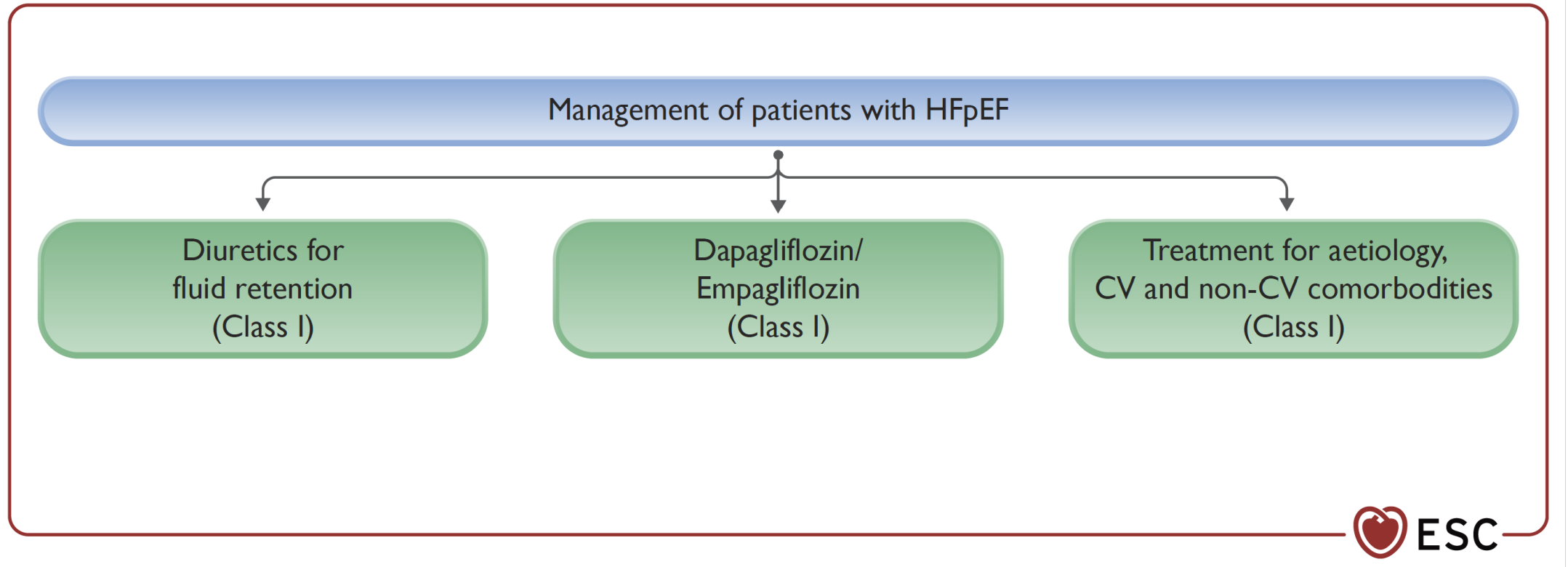
2023 Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

- ✓ HFmrEF and HFpEF
- ✓ Acute HF

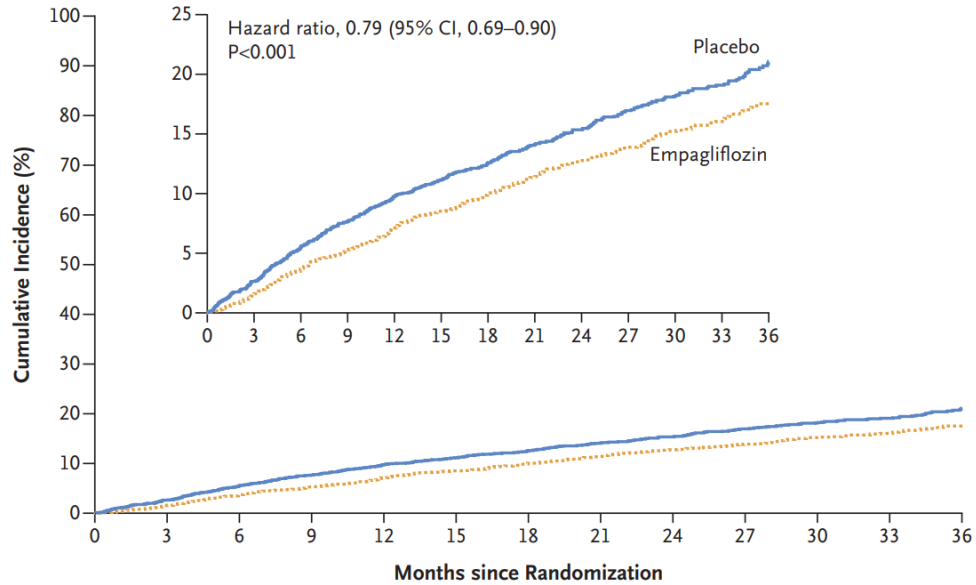
HF mildly reduced Ejection Fraction (EF 41-49%)



HF preserved Ejection Fraction ($EF \geq 50\%$)



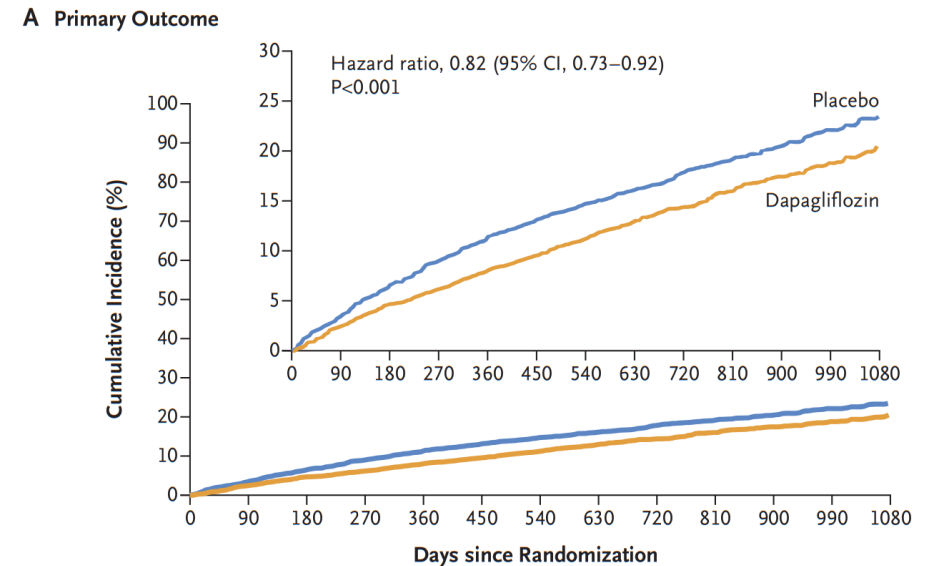
EMPEROR PRESERVED Empagliflozin



No. at Risk	0	3	6	9	12	15	18	21	24	27	30	33	36
Placebo	2991	2888	2786	2706	2627	2424	2066	1821	1534	1278	961	681	400
Empagliflozin	2997	2928	2843	2780	2708	2491	2134	1858	1578	1332	1005	709	402

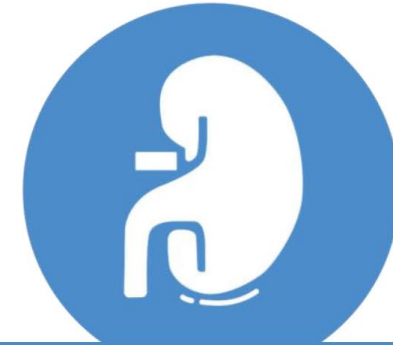
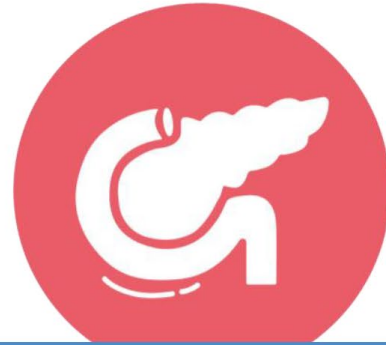
HR 0.79
(95% KI, 0.69-0.90)
p<0.001

DELIVER Dapagliflozin



No. at Risk	0	90	180	270	360	450	540	630	720	810	900	990	1080
Placebo	3132	3007	2896	2799	2710	2608	2318	2080	1923	1554	1140	772	383
Dapagliflozin	3131	3040	2949	2885	2807	2716	2401	2147	1982	1603	1181	801	389

HR 0.82
(95% KI, 0.73-0.92)
p<0.001



Jardiance® 10mg Empagliflozin	HbA _{1c} > 7% (nach Metformin)	HFrEF / HFmrEF / HFpEF	eGFR < 90-20 ml/min/1,73m ² + ACE-I / AT-II-I
Dapagliflozin	HbA _{1c} > 7% (nach Metformin)	HFrEF	eGFR 75-25 ml/min/1,73m ² + ACE-I / AT-II-I



Eisen - essenziell für das Leben



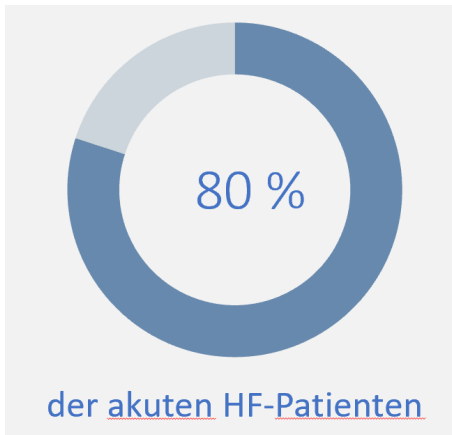
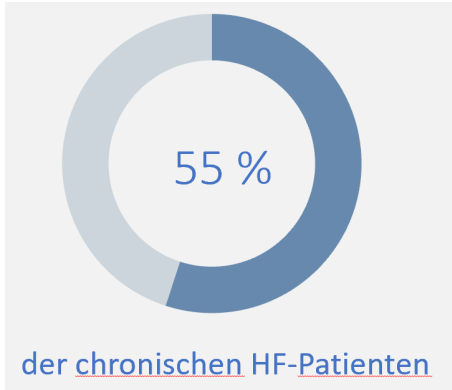
- ✓ 1/3 der Bevölkerung haben einen FE Mangel
- ✓ Hohes Risiko für FE Mangel

Kinder, Jugendliche, Frauen, ältere Menschen






chronischen Erkrankungen (Herzinsuffizienz, CKD, CED und Tumore)

- ✓ Gemüse (Fe^{3+}) - schlecht resorbiert
- ✓ Fleisch (Fe^{2+}) - besser resorbiert, kann nicht gespeichert werden

Herzinsuffizienz & Eisenmangel



In the setting of HF and iron deficiency (regardless of anaemia), patients demonstrate:

<p>Impaired exercise capacity</p> 	<p>Poor QoL</p> 	<p>High hospitalisation risk</p> 	<p>High mortality</p> 	<p>High healthcare costs</p> 
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FE Mangel Definition - ESC HF Guidelines

Recommendations	Class ^a	Level ^b
i.v. FE Substitution bei symptomatischer HI (EF<50%) mit FE Mangel - Symptome & Lebensqualität zu verbessern	I	A
- Risiko für Hospitalisierung wegen Herzinsuffizienz zu reduzieren	IIa	A

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DEFINITION VON EISENMANGEL

Serumsferritin <100 ng/mL



Serumsferritin 100-299 ng/mL mit TSAT <20%

Viele, aber nicht alle Pat. mit Herzinsuffizienz profitieren von iv Fe Substitution

- ✓ niedrige TSAT
- ✓ DM II
- ✓ chronischen Niereninsuffizienz
- ✓ KHK
- ✓ Anämie

größten Benefit (HI Hospitalisierungen & CV Tod)

Problem mit der aktuellen Definition von FE Mangel

Serumsferritin <100 ng/mL



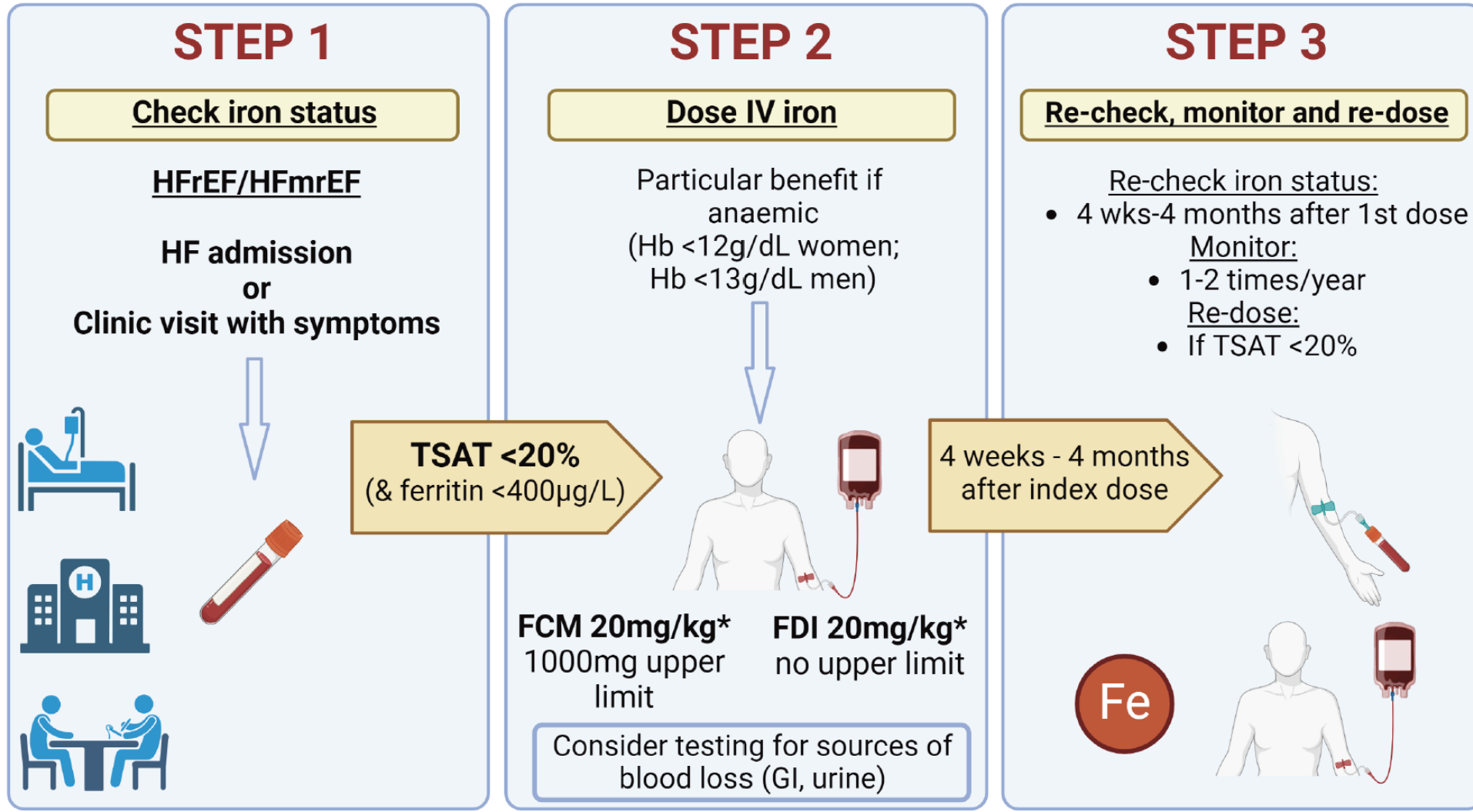
Serumsferritin 100-299 ng/mL mit TSAT <20%

- ✓ Willkürlich festgelegte Definition - keine Studien
- ✓ Ferritin <100 ng/ml, TSAT > 20%, behandelt Leute ohne Fe-Mangel („über-behandelt“)
- ✓ Ferritin 350ng/ml und TSAT 17% - hätte keinen FE-Mangel („nicht behandelt“)

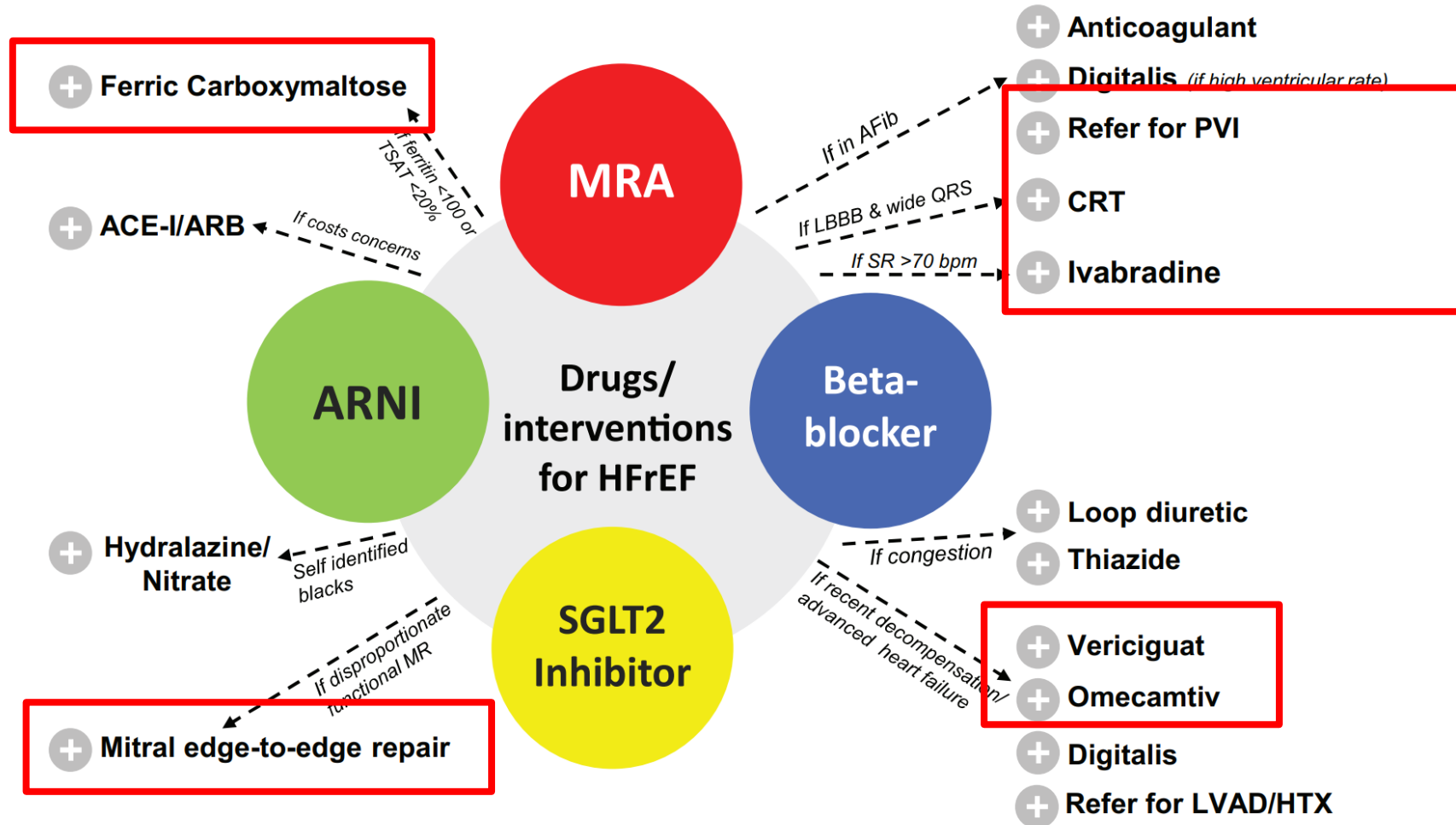
10-trial meta-analysis, inclusive of AFFIRM-AHF and IRONMAN	TSAT < 20%	2328	0.67 (0.49-0.92)	TSAT ≥ 20%	720	0.99 (0.74, 1.30)

33% relative Reduktion von Hospitalisierung wegen Herzinsuffizienz

Empfehlung für die Praxis



Modernes Herzinsuffizienzmanagement



Moderne Herzinsuffizienztherapie

Medikamente

Devices



Certified Chronic Heart Failure Nurse
Consultation on daily life



Doctor
Consultation on treatment



Pharmacist
Consultation on medicine



Physical Therapist
Consultation on rehabilitation

A team of specialists
are here
to provide advice
and support.



Medical Social Worker (MSW)
Consultation on nursing
and financial factors



Dietician
Consultation on food and nutrition



Clinical Engineer
Consultation on medical devices
such as pacemakers



Psychiatric Mental Health
Consultation on mental health

Interventionen

- Die Herzinsuffizienz ist eines der größten Gesundheitsprobleme des 21. Jh.
- Komplexes, heterogenes klinisches Syndrom - interdisziplinäres Management
- Etablierung der **Fantastic 4** innerhalb von **4 Wochen**
- Bei „Versagen“ der Fantastic 4 - **LVAD, HTx**
- **Screening auf Fe-Mangel (TSAT < 20%): Substitution mit iv Eisen**

- Devices (CRT-P/D) & Interventionen (PVI, PCI, MitraClip)
- Disease Management Programme (HerzMobil) und Rehabilitation
- **CAVE: Vulnerable Phase nach Entlassung**

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Drugs

Devices



Nephrologie
Kardiatechnik
Anästhesie
Herzchirurgie
Kardiologie
Infektiologie
Immunologie
Endokrinologie
Gastroenterologie

Pulmologie
HNO/Augenklinik
Dermatologie
Psychokardiologie
Palliativ Team

Interventions

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