Supplementary Table 1. Main characteristics of selected epidemiological studies across geographical regions

First author [reference]	Study source	Setting	Population	Period	Basic baseline characteristics	EF cut-offs	Epidemiological data
North America							
Lee et al. [21]	Observational cohort - Medicare claims data linked to EHR	Inpatient	N=138,388 individuals aged >65 years	2007-14	Age 72 years* Male 38% White 90%	rEF<45% pEF≥45%	Incidence rate (FU 3.4 years) • overall: 20.9/1000 py • pEF: 6.1/1000 py • rEF: 2.0/1000 py • uncertain EF: 12.9/1000 py
Tsao et al. [22]	Framingham Heart Study and Cardiovascular Health Study	Inpatient and outpatient	Individuals ≥60 years and free of HF at the beginning of each decade (N=8,762 for the 1st and 6,455 for the 2nd)	1990-99 and 2000-09	For the period 1990-9: Age 75 years (rEF)/76 years (pEF) Male 57% (rEF)/ 38% (pEF) White 91% (rEF)/91% (pEF) For the period 2000-09: Age 80 years (rEF)/81 years (pEF) Male 52% (rEF)/ 38% (pEF) White 90% (rEF)/92% (pEF)	rEF<50% pEF≥50%	Incidence rate (FU 70,548 person-years for 1990-9) • overall: 19.7/1000 py • pEF: 4.7/1000 py • rEF: 6.6/1000 py Incidence rate (FU 45,155 person-years for 2000-09) • overall: 18.9/1000 py • pEF: 6.8/1000 py • rEF: 6.2/1000 py
Vasan et al. [24]	Framingham Heart Study	Inpatient and outpatient	Participants free of HF	1985-2015	For the period 1985-94: Age 64 years (rEF)/58 years (mrEF)/55 years (pEF)	rEF<40% mrEF 40-49% pEF≥50%	Proportion of patients with rEF/pEF among patients with new-onset HF • 1985-94: 44%/41%

					Male 81% (rEF)/75% (mrEF)/ 43% (pEF) For the period 1995-2004: Age 64 years (rEF)/62 years (mrEF)/47 years (pEF) Male 87% (rEF)/82% (mrEF)/ 45% (pEF) For the period 2005-14: Age 74 years (rEF)/70 years (mrEF)/66 years (pEF) Male 79% (rEF)/90% (mrEF)/ 44% (pEF)		• 1995-2004: 44%/43% • 2005-14: 31%/56%
Shah et al. [27]	Get With The Guidelines–HF (GWTG) Registry merged with claims from the US Centers for Medicare and Medicaid Services	Inpatient	N=39,982 fee-for-service Medicare beneficiaries age ≥65 years hospitalised with a diagnosis of HF	2005-09	Age 79 years (rEF)/81 years (mrEF)/82 years (pEF) Male 59% (rEF)/ 48% (mrEF)/ 32% (pEF) White 81% (rEF)/82% (mrEF)/ 82% (pEF)	rEF≤40% mrEF 41-49% pEF≥50%	Proportion of patients: 46% rEF 8% mrEF 46% pEF
Owan et al. [28]	Olmsted County	Inpatient	N=4,596 consecutive patients hospitalised with HF at Mayo Clinic Hospitals	1987-2001	Age 72 years (rEF)/ 74 years (pEF) Male 65% (rEF)/ 44% (pEF)	rEF<50% pEF≥50%	Proportion of patients with pEF • 1987-1991: 38% • 1992-1996: 47% • 1997-2001: 54%

			with available echo data				
Bhatia et al. [29]	Enhanced Feedback for Effective Cardiac Treatment (EFFECT) study from 103 hospitals in the province of Ontario, Canada	Inpatient	N=2,802 newly admitted patients with a primary discharge diagnosis of HF	4/1999-3/2001	Age 72 years (rEF)/ 75 years (pEF) Male 63% (rEF)/ 34% (pEF)	rEF<40% pEF>50%	Proportion of patients: • 56% rEF • 31% pEF
Europe							
Gavina et al. [32]	Health Local Unit of Matosinhos, a regional health system in the north of Portugal	Outpatient	All individuals ≥18 years who attended healthcare units at least once in the 3 years before the index date (N=126,636)	2019-21	Age 74 years Male 48%	rEF≤40% mrEF 41-49% pEF≥50%	Prevalence of HF 2.1% Proportion of patients: • 16% rEF • 16% mrEF • 65% pEF
Escobar et al. [36]	BIG-PAC database (nationally representative, longitudinal database across seven Spanish Autonomous Communities)	Outpatient and inpatient	All adults with ≥1 inpatient or outpatient HF diagnosis and ≥1 year of continuous enrollment before the corresponding index date	01/2013-09/2019	In 01/2019: Age 74 years (rEF)/81 years (mrEF)/84 years (pEF) Male 66% (rEF)/ 51% (mrEF)/ 39% (pEF)	rEF≤40% mrEF 41-49% pEF≥50%	In 2019: Incidence rates (per 100 py) • 0.15 rEF • 0.02 mrEF • 0.10 pEF Prevalence rates (%) • 1.17 rEF • 0.10 mrEF • 0.90 pEF
Stolfo et al. [38]	Swedish HF Registry	Outpatient and inpatient	N=76,453 HF patients registered within the study	12/2005-12/2018	Age 76 years Male 63%	rEF <40% mrEF 40-49% pEF≥50%	Proportion of patients: • 53% rEF • 23% mrEF • 24% pEF

			period. Patients who died during index hospitalization were excluded. For patients with >1 registration, the first was selected				
Brouwers et al. [41]	PREVEND study, a community-based, middle-aged cohort study from the Netherlands	Outpatient and inpatient	N=8,592 in PREVEND, who had UAE >10 mg/L in their morning urine or were randomly selected with a UAE <10 mg/l, who attended the index outpatient clinic visit (1997-98) and did not have IDDM, were not pregnant and were able and willing to participate	1997-1/2010	Age 62 years (rEF)/ 63 years (pEF) Male 73% (rEF)/ 48% (pEF) White 98% (rEF)/ 98% (pEF)	rEF≤40% pEF≥50%	At median FU 11.5 years 4.4% were diagnosed with new HF, of whom 66% were rEF and 34% were pEF
Asia							
Hao et al. [44]	China Hypertension Survey (CHS)	Outpatient	N=22,158 individuals who completed the survey and had available data on echocardiogram, education attainment, smoking status,	10/2012-12/2015	Age 52 years (rEF)/60 years (mrEF)/65 years (pEF) Male 50% (rEF)/ 74% (mrEF)/ 44% (pEF)	rEF <40% mrEF 40-49% pEF≥50%	Among participants aged≥ 35 years the weighted prevalence was • 0.7% rEF • 0.3% mrEF • 0.3% pEF

			alcohol consumption, coronary artery disease, diabetes, dyslipidaemia and kidney disease.				
Harikrishnan et al. [47]	Indian National Heart Failure Registry (facility-based registry from 53 hospitals in 21 states and four union territories in India)	Inpatient	N=10,851 consecutive patients with ADHF	01/2019-07/2020	Age 60 years (rEF)/60 years (mrEF)/59 years (pEF) Male 72% (rEF)/ 69% (mrEF)/ 52% (pEF)	rEF<40% mrEF 41-49% pEF>50%	Proportion of patients: • 65% rEF • 22% mrEF • 13% pEF
Africa							
Stewart et al. [48]	Heart of Soweto Study	Inpatient	N=844 de novo HF cases captured during 2006	2006	Age 55 years Male 43% Black 88%	rEF≤45% pEF>45%	rEF 52% pEF 48%

**Characteristics of the total study cohort.*

***ADHF: acute decompensated heart failure; EHR: electronic health records; FU: follow-up; HF: heart failure; IDDM: insulin-dependent diabetes mellitus; mrEF: mildly reduced ejection fraction; pEF: preserved ejection fraction; py: person years; rEF: reduced ejection fraction; UAE: urinary albumin excretion.*

Supplementary Table 2. Main characteristics of selected mortality studies across geographical regions

First author [reference]	Study type-source	Setting	Population	Period	Basic baseline characteristics	EF cut-offs	Mortality data
North America							
Steinberg et al. [15]	Get With The Guidelines–HF (GWTG) Registry	Inpatient	N=110,621 consecutive patients with new or worsening HF and those who developed significant symptoms of HF in the hospital	1/2005-10/2010	Age 70 years (rEF)/76 years (mrEF)/78 years (pEF) Male 64% (rEF)/ 53% (mrEF)/ 37% (pEF) White 62% (rEF)/70% (mrEF)/ 71% (pEF)	rEF<40% mrEF 40-49% pEF≥50%	In-hospital mortality between 2005->2010 • rEF: 3.03%->2.83% • mrEF: 2.69%->2.88% • pEF: 3.32%->2.35%*
Tsao et al. [22]	Framingham Heart Study and Cardiovascular Health Study	Inpatient and outpatient	Individuals ≥60 years and free of HF at the beginning of each decade (N=8,762 for the 1st and 6,455 for the 2nd)	1990-99 and 2000-09	For the period 1990-9: Age 75 years (rEF)/76 years (pEF) Male 57% (rEF)/ 38% (pEF) White 91% (rEF)/91% (pEF) For the period 2000-9: Age 80 years (rEF)/81 years (pEF) Male 52% (rEF)/ 38% (pEF) White 90% (rEF)/92% (pEF)	rEF<50% pEF≥50%	5-year mortality rates (FU 2.75 ± 2.03 years) • pEF: 64.1% • rEF: 66% Similar mortality between HFrEF and HFpEF within 1990-99 and 2000-09 Similar mortality for both rEF and pEF between 1990-99 and 2000-09
Shah et al. [27]	GWTG Registry merged with claims from the US Centers for	Inpatient	N=39,982 fee-for-service Medicare beneficiaries age ≥65 years hospitalized	2005-09	Age 79 years (rEF)/81 years (mrEF)/82 years (pEF)	rEF≤40% mrEF 41-49% pEF≥50%	Similar mortality rates at 5 years (pEF reference) Unadjusted HRs • rEF: 1.01 • mrEF: 1.01

	Medicare and Medicaid Services		with a diagnosis of HF		Male 59% (rEF)/ 48% (mrEF)/ 32% (pEF) White 81% (rEF)/82% (mrEF)/ 82% (pEF)		Adjusted HRs • rEF: 0.99 • mrEF: 1.00
Owan et al. [28]	Olmsted County	Inpatient	N=4,596 consecutive patients hospitalised with HF at Mayo Clinic Hospitals with available echo data	1987-2001	Age 72 years (rEF)/ 74 years (pEF) Male 65% (rEF)/ 44% (pEF)	rEF<50% pEF≥50%	Mortality rates (FU 10 ± 4.2 years) at - 1 year* • rEF: 32% • pEF: 29% - 5 years* • rEF: 68% • pEF: 65% Adj. HR for death for pEF vs rEF: 0.96; 95%CI: 0.92-1.00*
Bhatia et al. [29]	Enhanced Feedback for Effective Cardiac Treatment (EFFECT) study from 103 hospitals in the province of Ontario, Canada	Inpatient	Newly admitted patients with a primary discharge diagnosis of HF	4/1999-3/2001	Age 72 years (rEF)/ 75 years (pEF) Male 63% (rEF)/ 34% (pEF)	rEF<40% pEF>50%	Similar mortality rates at -30 days • rEF: 7.1% • pEF: 5.3% -1 year • rEF: 25.5% • pEF: 22.2%
Fonarow et al. [56]	Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF) registry	Inpatient	N=41,267 patients with new or worsening HF and those who developed significant symptoms of HF in the hospital	3/2003-12/2004	Age 70 years (rEF)/ 75 years (pEF) Male 62% (rEF)/ 38% (pEF) White 71% (rEF)/ 77% (pEF)	rEF<40% pEF≥40%	Unadj. in-hospital mortality* • rEF: 3.9% • pEF: 2.9% (unadj. OR: 1.34; 95% CI: 1.19-1.50) Unadj. mortality at 60-90 days • rEF: 9.8% • pEF: 9.5%

Europe							
Brouwers et al. [41]	PREVEND study, a community-based, middle-aged cohort study from the Netherlands	Outpatient and inpatient	N=8,592 in PREVEND, who had UAE >10 mg/L in their morning urine or were randomly selected with a UAE <10 mg/L, who attended the index outpatient clinic visit (1997-98) and did not have IDDM, were not pregnant and were able and willing to participate.	1997-1/2010	Age 62 years (rEF)/ 63 years (pEF) Male 73% (rEF)/ 48% (pEF) White 98% (rEF)/ 98% (pEF)	rEF≤40% pEF≥50%	5-year all-cause mortality significantly higher for new onset rEF compared with new onset pEF
Koh et al. [57]	Swedish HF Registry	Outpatient and inpatient	N=42,061 HF patients registered within the study period for who EF data were available. Patients who died during index hospitalization were excluded. For patients with >1 registration, the first was selected.	2000-12	Age 72 years (rEF)/74 years (mrEF)/77 years (pEF) Male 71% (rEF)/ 61% (mrEF)/ 45% (pEF)	rEF<40% mrEF 40-49% pEF≥50%	Crude mortality rates (per 1,000 py) • rEF: 146.6 • mrEF: 140.7 • pEF: 175.8 Adj. HRs for mortality at (pEF reference) -30 days • mrEF: 1.06 • rEF: 1.35* -1 year • mrEF: 1.08 • rEF: 1.26* - 3 years

							• mrEF: 1.06 • rEF: 1.20*
Vergaro et al. [58]	Fondazione Toscana Gabriele Monasterio in Pisa, Italy	Outpatient	N=2,791 patients referred for HF management and had stable HF symptoms and therapy ≥1 month. Those with ACS or cardiac surgery ≤3 months were excluded.	2000-16	Age 68 years (rEF)/69 years (mrEF)/71 years (pEF) Male 76% (rEF)/ 72% (mrEF)/ 52% (pEF)	rEF<40% mrEF 40-49% pEF≥50%	Mortality rates at -1 year* • rEF: 11% • mrEF: 8% • pEF: 5% -5 years* • rEF: 31% • mrEF: 20% • pEF: 17% -10 years* • rEF: 39% • mrEF: 25% • pEF: 22% Cardiac mortality rates at -1 year* • rEF: 8% • mrEF: 4% • pEF: 2% -5 years* • rEF: 21% • mrEF: 9% • pEF: 7% -10 years* • rEF: 25% • mrEF: 11% • pEF: 8% Rates of non-cardiac death were similar among patients with rEF, mrEF and pEF

Kapłon-Cieślicka et al. [62]	ESC-HFA EORP HF Long-Term Registry	Inpatient	N=5,951 patients with AHF and available data on EF. Patients with ACS and moderate to severe aortic stenosis were excluded	3/2011-9/2018	Age 66 years (rEF)/71 years (mrEF)/74 years (pEF) Male 75% (rEF)/ 60% (mrEF)/ 44% (pEF)	rEF<40% mrEF 40-49% pEF≥50%	In-hospital mortality was higher in rEF • rEF: 3.4%* • mrEF: 2.1% • pEF: 2.2% Crude HRs for 1-year (pEF reference) - all-cause mortality • mrEF: 1.0 • rEF: 1.2* - non-CV mortality • mrEF: 0.7 • rEF: 0.5* Adj. HRs for 1-year (pEF reference) - all-cause mortality • mrEF: 1.0 • rEF: 1.2* - non-CV mortality • mrEF: 0.8 • rEF: 0.6
Asia							
Harikrishnan et al. [47]	Indian National Heart Failure Registry (facility-based registry from 53 hospitals in 21 states and four union territories in India)	Inpatient	N=10,851 consecutive patients with ADHF	01/2019-07/2020	Age 60 years (rEF)/60 years (mrEF)/59 years (pEF) Male 72% (rEF)/ 69% (mrEF)/ 52% (pEF)	rEF<40% mrEF 41-49% pEF>50%	In-hospital mortality (P-value not provided) • rEF: 7.5% • mrEF: 5.1% • pEF: 5.5% Adj. HRs for mortality at 90-day (rEF reference) • mrEF: 0.95 • *pEF: 0.77**

Tsuchihashi-Makaya et al. [65]	Japanese Cardiac Registry of Heart Failure in Cardiology (JCARE-CARD)	Inpatient	N=2,675 patients hospitalised due to worsening of HF symptoms	01/2004-06/2005	Age 67 years (rEF)/74 years (pEF) Male 72% (rEF)/53% (pEF)	rEF<40% pEF≥50%	In-hospital mortality* • rEF: 3.9% • pEF: 6.5% Unadj. HR (rEF reference): 1.74; 95%CI: 1.05-2.87* Adj. HR: 2.94; 95%CI: 0.89-9.72 During 2.4 years of FU -All-cause mortality • rEF:17.8% • pEF: 22.7% Unadj. HR: 1.30; 95%CI: 0.99-1.70 Adj. HR: 0.93; 95%CI: 0.66-1.30 -Cardiac mortality • rEF:11.8% • pEF: 13.5% Unadj. HR: 1.15; 95%CI: 0.82-1.62 Adj. HR: 0.86; 95%CI: 0.56-1.32
Kitai et al. [66]	Kyoto Congestive Heart Failure (KCHF) registry	Inpatient	N= 3717 patients discharged after index hospitalization for ADHF	10/2014-3/2016	Age 74 years (rEF)/78 years (mrEF)/81 years (pEF) Male 67% (rEF)/ 60% (mrEF)/43% (pEF)	rEF<40% mrEF 40-49% pEF≥50%	Crude rates (median FU of 470 days) were similar for 3 EF groups - all-cause mortality • rEF: 22% • mrEF: 23% • pEF: 24% - CV mortality • rEF: 15% • mrEF: 14% • pEF: 14% - non-CV mortality

							• rEF: 6.8% • mrEF: 8.7% • pEF: 10.2%
Zhang et al. [67]	China HF Registry	Inpatient	N=13,687 patients with HF	01/2012-09/2015	Age 60 years (rEF)/ 69 years (pEF) Male 70% (rEF)/ 53% (pEF)	rEF≤40% pEF≥50%	In-hospital mortality* • rEF: 4.0% • pEF: 1.7%
MacDonald et al. [68]	Asian Sudden Cardiac Death in Heart Failure (ASIAN-HF) Registry	Outpatient and inpatient	N=6480 patients aged >18 years with symptomatic HF from 46 secondary care centers in 10 countries from 3 Asian regions: South, Southeast and Northeast Asia	10/2012-12/2015 for rEF 9/2013-10/2016 for pEF	South Asia: Age 58 years (rEF)/ 63 years (pEF) Male 76% (rEF)/ 53% (pEF) Southeast Asia: Age 59 years (rEF)/ 67 years (pEF) Male 82% (rEF)/ 50% (pEF) Northeast Asia: Age 63 years (rEF)/ 72 years (pEF) Male 75% (rEF)/ 49% (pEF)	rEF<40% pEF≥50%	1-year crude all-cause mortality* • rEF: 10.6% • pEF: 5.4% In South Asia: • rEF: 8.3% • pEF: 2.9% In Southeast Asia: • rEF: 13.6% • pEF: 10.3% In Northeast Asia: • rEF: 8.9% • pEF: 2.8%
Australia							
Tan et al. [69]	Victorian Cardiac Outcomes Registry-Heart Failure (VCOR-HF) snapshot	Inpatient	N=1,132 patients hospitalised with an admission diagnosis of AHF, which was also confirmed at discharge,	One month in each of the years 2014–2017	Age 73 years (rEF)/81 years (pEF) Male 69% (rEF)/ 41% (pEF)	rEF<50% pEF≥50%	Similar in-hospital mortality • rEF: 4.8% • pEF: 4.2% Similar 30-day mortality • rEF: 8.0% • pEF: 8.3%

			and aged >18 years.				
International							
Tromp et al. [70]	The international registry to assess medical practice with longitudinal observation for treatment of heart failure (REPORT-HF)	Inpatient	N=18,102 adults hospitalised with a primary diagnosis of AHF enrolled in 358 centers in 44 countries on six continents. Participants in a clinical trial with any investigational treatment were excluded	07/2014-03/2017	Age 67 years Male 61% White 52%	rEF<40% mrEF 40-49% pEF≥50%	1-year all-cause mortality (rEF reference) •mrEF -Unadj. HR: 0.83; 95%CI: 0.75-0.92* -Adj. HR: 0.83; 95%CI: 0.74-0.92* •pEF -Unadj. HR: 0.72; 95%CI: 0.66-0.78* -Adj. HR: 0.67; 95%CI: 0.61-0.74*
Dokainish et al. [73]	International Congestive Heart Failure (INTER-CHF) study	Outpatient and inpatient	N=5,823 patients with HF from 108 centers in six geographical regions (Africa, China, India, the Middle East, Southeast Asia and South America)	09/2012-02/2014	Age 59 years Male 61%	rEF<40%	1-year all-cause mortality for rEF (vs EF≥40%) -Unadj. HR: 1.3; 95%CI: 1.1-1.5* -Adj. HR: 1.1; 95%CI: 0.9-1.4

**P<0.05.*

***ACS: acute coronary syndrome; ADHF: acute decompensated heart failure; AHF: acute heart failure; CI: confidence interval; CV: cardiovascular; EF: ejection fraction; EHR: electronic health records; FU: follow-up; HF: heart failure; HR: hazard ratio; IDDM: insulin-dependent diabetes mellitus; mrEF: mildly reduced ejection fraction; OR: odds ratio; pEF: preserved ejection fraction; py: person years; rEF: reduced ejection fraction; UAE: urinary albumin excretion.*