

Supplementary Table 1: International Classification of Diseases 10th edition and advanced heart failure treatment codes used in the validation

<i>Diagnosis</i>	<i>International Classification of Diseases 10th edition codes</i>
Heart failure	DI130, DI132, DI420, DI426, DI427, DI428, DI429, DI500, DI501, DI502, DI508, DI509, DI510
<i>Advanced heart failure treatment</i>	<i>Procedure codes</i>
Implantable cardioverter-defibrillator (ICD)	BFCB00, BFCB01, BFCB20
Cardiac resynchronisation therapy pacemaker (CRT-P)	BFCB05, BFCB06, BFCA21, BFCA63
Cardiac resynchronisation therapy defibrillator (CRT-D)	BFCB03, BFCB21
Left ventricular assist device (LVAD)	KFXL10, KZFX70
Intra-aortic balloon pump (IABP)	KFXG00
Impella	KFXL00
Cardiopulmonary support (CPS)	KFXD00, KFXE00
Heart transplantation (HTx)	KFQA00, KFQA10

Supplementary Table 2: The positive predictive value of first-time heart failure in the Danish National Patient Registry, 2017–2022, by sex

Type of contact	Type of diagnosis	Male sex		Female sex	
		Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)
In or outpatient	Primary or secondary	110/131	84 (77–90)	51/69	74 (62–84)
Inpatient	Primary	23/28	82 (63–93)	17/22	77 (55–92)
Inpatient	Secondary	29/35	83 (66–93)	9/15	60 (32–84)
Outpatient	Primary	32/38	84 (69–94)	8/12	67 (35–90)
Outpatient	Secondary	26/30	87 (69–96)	17/20	85 (62–97)

Abbreviations: CI, confidence interval; PPV, positive predictive value.

*Statistically significant different from males (significance level = 0.05).

Supplementary Table 3: The positive predictive value of first-time heart failure in the Danish National Patient Registry, 2017–2022, by age

Type of contact	Type of diagnosis	Age ≤59 years		Age 60–79 years		Age ≥80 years	
		Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)
In or outpatient	Primary or secondary	39/43	91 (78–97)	88/100	80 (71–87)	34/47	72 (57–84)*†
Inpatient	Primary	10/10	100 (69–100)	22/30	73 (58–88)	8/10	80 (44–97)
Inpatient	Secondary	6/9	67 (30–93)	21/24	88 (68–97)	11/17	65 (38–86)
Outpatient	Primary	11/12	92 (62–100)	22/27	81 (62–94)	7/11	64 (31–89)
Outpatient	Secondary	12/12	100 (74–100)	23/29	79 (60–92)	8/9	89 (52–100)

Abbreviations: CI, confidence interval; PPV, positive predictive value.

*Statistically significant different from age ≤59 years (significance level = 0.05).

†Statistically significant different from age 60–79 years (significance level = 0.05).

Supplementary Table 4: The positive predictive value of first-time heart failure in the Danish National Patient Registry, 2017–2022, by sex

Advanced heart failure treatment	Male sex		Female sex	
	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)
Implantable cardioverter-defibrillator (ICD)	80/82	98 (91–100)	17/18	94 (73–100)
Cardiac resynchronisation therapy pacemaker (CRT-P)	41/43	95 (84–99)	7/7	100 (59–100)
Cardiac resynchronisation therapy defibrillator (CRT-D)	40/46	87 (74–95)	NA	NA
Left ventricular assist device (LVAD)	19/19	100 (82–100)	NA	NA
Intra-aortic balloon pump (IABP)	6/12	50 (22–79)	NA	NA
Impella	13/36	36 (21–54)	6/14	43 (18–71)
Cardiopulmonary support (CPS)	34/34	100 (90–100)	16/16	100 (79–100)
Heart transplantation (HTx)	38/38	100 (91–100)	18/18	100 (81–100)

Abbreviations: CI, confidence interval; PPV, positive predictive value.

*Statistically significant different from males (significance level = 0.05).

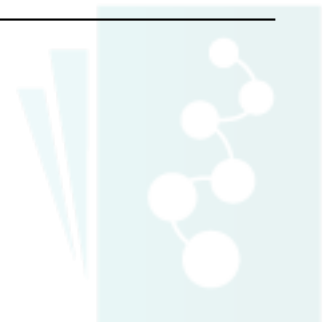
Supplementary Table 5: The positive predictive value of first-time heart failure in the Danish National Patient Registry, 2017–2022, by age

Advanced heart failure treatment	Age ≤59 years		Age 60–79 years		Age ≥80 years	
	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)
Implantable cardioverter-defibrillator (ICD)	33/35	94 (81–99)	48/49	98 (89–100)	6/6	100 (54–100)
Cardiac resynchronisation therapy pacemaker (CRT-P)	6/6	100 (54–100)	18/19	95 (74–100)	24/25	96 (80–100)
Cardiac resynchronisation therapy defibrillator (CRT-D)	11/13	85 (55–98)	32/34	94 (80–99)	NA	NA
Left ventricular assist device (LVAD)	10/10	100 (69–100)	12/12	100 (74–100)	NA	NA
Intra-aortic balloon pump (IABP)	NA	NA	6/13	46 (19–75)	NA	NA
Impella	NA	NA	12/20	60 (36–81)	NA	NA
Cardiopulmonary support (CPS)	27/27	100 (87–100)	22/22	100 (85–100)	NA	NA
Heart transplantation (HTx)	32/32	100 (89–100)	24/24	100 (86–100)	NA	NA

Abbreviations: CI, confidence interval; PPV, positive predictive value.

*Statistically significant different from age ≤59 years (significance level = 0.05).

†Statistically significant different from age 60–79 years (significance level = 0.05).



Supplementary Table 6: The positive predictive value of heart failure admissions after implantable cardioverter-defibrillator (ICD) or cardiac resynchronisation therapy (CRT) in the Danish National Patient Registry, 2017–2022, by sex

Heart failure admission	Male sex		Female sex	
	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)
<i>After implantable cardioverter-defibrillator (ICD)</i>				
In or outpatient	16/65	25 (15–37)	NA	NA
Inpatient	8/19	42 (20–67)	NA	NA
Outpatient	8/46	17 (7.8–31)	NA	NA
<i>After cardiac resynchronization therapy (CRT)</i>				
In or outpatient	15/47	32 (19–47)	6/15	40 (16–68)
Inpatient	5/11	45 (17–77)	NA	NA
Outpatient	10/36	28 (14–45)	6/13	46 (19–75)

Abbreviations: CI, confidence interval; PPV, positive predictive value.

*Statistically significant different from males (significance level = 0.05).

Supplementary Table 7: The positive predictive value of heart failure admissions after implantable cardioverter-defibrillator (ICD) or cardiac resynchronisation therapy (CRT) in the Danish National Patient Registry, 2017–2022, by age

Heart failure admission	Age ≤59 years		Age 60–79 years		Age ≥80 years	
	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)	Confirmed, n / reviewed, n	PPV, % (95% CI)
<i>After implantable cardioverter-defibrillator (ICD)</i>						
	6/22	27 (11–50)	12/47	26 (14–40)	NA	NA
In or outpatient	NA	NA	NA	NA	NA	NA
Inpatient	NA	NA	8/35	23 (10–40)	NA	NA
Outpatient						
<i>After cardiac resynchronisation therapy (CRT)</i>						
	8/22	36 (17–59)	10/30	33 (17–53)	NA	NA
In or outpatient	NA	NA	NA	NA	NA	NA
Inpatient	7/19	37 (16–62)	6/20	30 (12–54)	NA	NA
Outpatient						

Abbreviations: CI, confidence interval; PPV, positive predictive value.

*Statistically significant different from age ≤59 years (significance level = 0.05).

†Statistically significant different from age 60–79 years (significance level = 0.05).



Supplementary Table 8: Agreement between medical records adjudicators

Diagnosis or procedure	Type of contact	Type of diagnosis	Agreement	Kappa
First-time heart failure	In or outpatient	Primary or secondary	90%	0.72
	Inpatient	Primary	90%	0.70
	Inpatient	Secondary	96%	0.90
	Outpatient	Primary	94%	0.82
	Outpatient	Secondary	82%	0.34
Advanced heart failure treatment				
Implantable cardioverter-defibrillator (CRT)	NA	NA	98%	0.49
Cardiac resynchronisation therapy pacemaker (CRT-P)	NA	NA	96%	NA
Cardiac resynchronisation therapy defibrillator (CRT-D)	NA	NA	94%	0.64
Left ventricular assist device (LVAD)	NA	NA	100%	NA
Intra-aortic balloon pump (IABP)	NA	NA	100%	1.00
Impella	NA	NA	98%	0.96
Cardiopulmonary support (CPS)	NA	NA	100%	NA
Heart transplantation (HTx)	NA	NA	100%	NA
Heart failure admission				
After implantable cardioverter-defibrillator (ICD)	In or outpatient	Primary	94%	0.85
	Inpatient	Primary	95%	0.90
	Outpatient	Primary	94%	0.81
After chronic resynchronization therapy (CRT)	In or outpatient	Primary	98%	0.96
	Inpatient	Primary	100%	1.00
	Outpatient	Primary	98%	0.95

