Supplement for "The use of electronic health data to estimate heart failure events in a population-based CKD cohort"

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Supplemental Legend:

Supplemental Table 1. *International Classification of Disease, Ninth Revision* (ICD-9) codes used to identify health conditions.

Supplemental Table 2. Incidence rates for heart failure events in a chronic kidney disease cohort according to case-identification algorithm, subgroup with prevalent heart failure at baseline.

Supplemental Table 3. Incidence rates for heart failure events in a chronic kidney disease cohort according to case-identification algorithm, subgroup with no prevalent heart failure at baseline.

Supplemental Table 4. Incidence rates for heart failure events in a chronic kidney disease cohort by sex, age, and eGFR.

Supplemental Table 1. *International Classification of Disease, Ninth Revision* (ICD-9) codes used to identify health conditions.

Condition	ICD-9 codes
Myocardial infarction	410
Stroke	430, 431, 432.9, 434, 436
Heart failure	402.x1, 404.x1, 425.4, 428
End stage renal disease	585.6
Paget's disease	731
Metastatic cancer	196, 197, 198, 199

Supplemental Table 2. Incidence rates for heart failure events in a chronic kidney disease cohort according to case-identification algorithm, **subgroup with prevalent heart failure at baseline.**

	Estimated HF events	Person-years	Rate (95% CI)	% of events identified*
Diagnosis-code only events				
Principal diagnosis hospitalizations	172	3,479	49.4 (42.6 - 57.4)	41%
Events estimated from validation results				
Principal diagnosis hospitalizations	169	3,483	48.6 (41.7 - 57.0)	40%
Principal and secondary diagnosis hospitalizations	425	3,145	135.1 (119.5 - 150.6)	100%

For events estimated from validation results, the number of events, person-time, and incidence rates were averaged across 100 datasets that estimated HF events from hospitalizations and outpatient encounters with heart failure diagnosis codes, based on the positive predicted values from the validation study reported in Table 2. Follow up was censored at the time of a first estimated heart failure event, death, or the end of the study. *Percentage of heart failure events estimated by the most comprehensive algorithm that included all heart failure hospitalization and outpatient heart failure encounters.

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Supplemental Table 3. Incidence rates for heart failure events in a chronic kidney disease cohort according to case-identification algorithm, **subgroup with no prevalent heart failure at baseline.**

	Estimated HF events	Person-years	Rate (95% CI), per 1,000 person years	% of events identified*
Diagnosis-code only events				
Principal diagnosis hospitalizations	231	37,595	6.1 (5.4 - 7.0)	24%
Events estimated from validation results				
Principal diagnosis hospitalizations	223	37,604	5.9 (5.1 - 6.8)	23%
Principal and secondary diagnosis hospitalizations	693	37,066	18.7 (17.1 - 20.4)	71%
Hospitalizations and outpatient	975	36,629	26.6 (24.8 - 28.4)	100%

For events estimated from validation results, the number of events, person-time, and incidence rates were averaged across 100 datasets that estimated HF events from hospitalizations and outpatient encounters with heart failure diagnosis codes, based on the positive predicted values from the validation study reported in Table 2. Follow up was censored at the time of a first estimated heart failure event, death, or the end of the study. *Percentage of heart failure events estimated by the most comprehensive algorithm that included all heart failure hospitalization and outpatient heart failure encounters.

Supplemental Table 4. Incidence rates for heart failure events in a chronic kidney disease cohort by sex, age, and eGFR.

	Men			Women			Men + Women		
	Events	Person-years	Rate (95% CI), per 1,000 person years	Events	Person-years	Rate (95% CI), per 1,000 person years	Events	Person-years	Rate (95% CI), per 1,000 person years
All persons	615	14728	41.8 (38.2, 45.4)	782	25052	31.2 (28.7, 33.8)	1399	39770	35.2 (33.1, 37.4)
Age, years									
<60	36	2799	12.7 (8.7, 17.6)	49	5039	9.8 (6.9, 12.9)	85	7845	10.9 (8.5, 13.7)
60 to 69	114	4404	25.9 (20.9, 31.2)	118	6749	17.5 (14.0, 21.1)	233	11156	20.9 (18.0, 24.0)
70 to 79	219	4730	46.3 (39.4, 53.4)	272	7312	37.2 (32.4, 42.4)	492	12038	40.9 (37.0, 45.5)
80+	249	2787	89.2 (76.1, 102.0)	342	5950	57.5 (50.5, 64.8)	590	8731	67.6 (61.5, 74.2)
eGFR, mL/min/1.73m^2									
45 to 59	341	11192	30.5 (26.8, 34.3)	416	18565	22.4 (20.0, 24.8)	758	29753	25.5 (23.5, 27.6)
30 to 44	226	3111	72.7 (62.3, 83.9)	292	5751	50.8 (44.1, 57.8)	520	8865	58.7 (53.2, 64.4)
20 to 29	50	417	119.9 (84.3, 160.5)	73	734	99.3 (74.9, 125.6)	122	1152	106.3 (85.8, 128.0)

The estimated number of events, person-time, and incidence rates were averaged across 100 datasets that estimated HF events from hospitalizations and outpatient encounters with heart failure diagnosis codes, based on the positive predicted values from the validation study reported in Table 2.