

## **SUPPLEMENTAL MATERIAL**

### **ESTIMATED GLOMERULAR FILTRATION RATE AND THE RISK OF CANCER**

Supplemental Table 1. List of ICD-10 codes for comorbidity definitions.

Supplemental Table 2. List of ICD-10 codes of cancer diagnosis.

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Supplemental Figure 1. Flow chart of study participants

Supplemental Figure 2. Hazard ratios for any-type and selected site-specific cancers by eGFR strata using a time-varying follow up.

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

**Supplement Table 1. List of ICD-10 codes for comorbidity definitions**

<b>Comorbidities</b>	<b>ICD-10 codes</b>	<b>ATC codes</b>
Hypertension	I10-15	C03, C07, C08, C09
Cardiovascular disease		
Myocardial infarction	I21, I22, I252	
Congestive heart failure	I099, I110, I130, I132, I255, I420, I425-429, I43, I50, P290	
Peripheral vascular disease	I70, I71, I731, I738, I739, I771, I790, I792, K551, K558, K559, Z958, Z959	
Cerebrovascular disease	G45-46, H340, I60-69	
Diabetes mellitus	E10-14	A10A, A10B
Chronic obstructive pulmonary disease	I278, I279, J40-47, J60-67, J684, J701, J703	
Rheumatic disease	M05, M06, M315, M32-M34, M351, M353, M360	
Dementia	F00-F03, F051, G30, G311	
Peptic ulcer disease	K25-K28	
Liver disease	Mild (B18, K700-K703, K709, K713-K715, K717, K73, K74, K760, K762-K764, K768, K769, Z944) OR moderate/severe (I850, I859, I864, I982, K704, K711, K721, K729, K765, K766, K767)	
Hemiplegia or paraplegia	G041, G114, G801, G802, G81, G82, G830-G834, G839	
Chronic infections	B15-B19, B20-B24, A15-A19	

**Supplement Table 2. List of ICD-10 codes for cancer outcomes**

<b>Any –cancer and Site-specific cancer</b>	<b>ICD-10 codes</b>
<b>Any-cancer</b>	<b>C00-C26, C30-C39, C40-C41, C43- C44, C45-C49, C50-C58, C60-C76, C76-C80, C81-C96</b>
<b>Oral cavity and pharynx</b>	<b>C00–C14</b>
<b>Oesophagus and Stomach</b>	<b>C15, C16</b>
<b>Small intestine</b>	<b>C17</b>
<b>Colon and Rectum</b>	<b>C18-C21</b>
<b>Liver, Gall bladder, and Bile duct</b>	<b>C22-C24</b>
<b>Pancreas</b>	<b>C25</b>
<b>Larynx</b>	<b>C26</b>
<b>Lung and bronchus</b>	<b>C34</b>
<b>Bone and articular cartilage</b>	<b>C40–C41</b>
<b>Skin</b>	<b>C43-C44 (Melanoma C43, Non-melanoma C44)</b>
<b>Soft tissue</b>	<b>C45–C49</b>
<b>Breast</b>	<b>C50</b>
<b>Cervix</b>	<b>C53</b>
<b>Unspecified parts of uterus</b>	<b>C54-C55</b>
<b>Ovary</b>	<b>C56</b>
<b>Prostate</b>	<b>C61</b>
<b>Urogenital</b>	
<b>kidney</b>	<b>C64</b>
<b>Ureter</b>	<b>C66</b>
<b>Bladder</b>	<b>C67</b>
<b>Central nervous system</b>	<b>C69–C72</b>
<b>Thyroid</b>	<b>C73</b>
<b>Hematological</b>	
<b>Non-Hodgkin’s lymphoma</b>	<b>C82–C85</b>
<b>Multiple myeloma</b>	<b>C90</b>
<b>Leukaemia</b>	<b>C91-C95</b>
<b>Unknown origin</b>	<b>C76–C80</b>

**Supplement Table 3. Site-specific cancer cases registered during follow up, overall and by eGFR strata.**

eGFR strata, ml/min/1.73m <sup>2</sup>	Overall (n=719,033)	eGFR<30 (n=4,632)	eGFR 30-59 (n=52,651)	eGFR 60-89 (n=300,939)	eGFR 90-104 (n=252,462)	eGFR 105+ (n=108,349)
<b>Any-cancer</b>	64319 (8.9%)	648 (14.0%)	8570 (16.3%)	34149 (11.3%)	17506 (6.9%)	3446 (3.2%)
Oral cavity and pharynx	1295 (0.2%)	9 (0.2%)	135 (0.3%)	593 (0.2%)	438 (0.2%)	120 (0.1%)
Oesophagus and stomach	1518 (0.2%)	14 (0.3%)	188 (0.4%)	790 (0.3%)	420 (0.2%)	106 (0.1%)
Small intestine	426 (0.1%)	2 (<1%)	45 (0.1%)	205 (0.1%)	148 (0.1%)	26 (<1%)
Colon and rectum	6077 (0.8%)	55 (1.2%)	845 (1.6%)	3284 (1.1%)	1575 (0.6%)	318 (0.3%)
Liver, gall bladder and bile duct	1731 (0.2%)	17 (0.4%)	210 (0.4%)	852 (0.3%)	503 (0.2%)	149 (0.1%)
Pancreas	2069 (0.3%)	21 (0.5%)	296 (0.6%)	1104 (0.4%)	541 (0.2%)	107 (0.1%)
Larynx	842 (0.1%)	7 (0.2%)	129 (0.2%)	451 (0.1%)	214 (0.1%)	41 (<1%)
Lung and bronchus	5023 (0.7%)	40 (0.9%)	611 (1.2%)	2508 (0.8%)	1573 (0.6%)	291 (0.3%)
Bone and articular cartilage	205 (<1%)	1 (<1%)	24 (<1%)	96 (<1%)	62 (<1%)	22 (<1%)
Skin	19988 (2.8%)	246 (5.3%)	3204 (6.1%)	11191 (3.7%)	4583 (1.8%)	764 (0.7%)
Melanoma	2842 (0.4%)	15 (0.3%)	326 (0.6%)	1474 (0.5%)	843 (0.3%)	184 (0.2%)
Non-melanoma	18046 (2.5%)	238 (5.1%)	3035 (5.8%)	10226 (3.4%)	3936 (1.6%)	611 (0.6%)
Soft tissue	1219 (0.2%)	15 (0.3%)	140 (0.3%)	634 (0.2%)	340 (0.1%)	90 (0.1%)
Breast	7552 (1.1%)	36 (0.8%)	680 (1.3%)	3714 (1.2%)	2431 (1.0%)	691 (0.6%)
Breast (in women, n=382,036)	7341 (1.9%)	34 (1.3%)	666 (2.0%)	3603 (2.2%)	2363 (1.9%)	675 (1.2%)
Cervix	475 (0.1%)	3 (0.1%)	54 (0.1%)	218 (0.1%)	136 (0.1%)	64 (0.1%)
Unspecific of uterus	1580 (0.2%)	20 (0.4%)	200 (0.4%)	855 (0.3%)	432 (0.2%)	73 (0.1%)
Ovary	1227 (0.2%)	9 (0.2%)	118 (0.2%)	631 (0.2%)	381 (0.2%)	88 (0.1%)
Prostate	11432 (1.6%)	94 (2.0%)	1273 (2.4%)	6437 (2.1%)	3319 (1.3%)	309 (0.3%)
Prostate (in men, n=336,997)	11427 (3.4%)	94 (4.8%)	1272 (6.4%)	6434 (4.7%)	3318 (2.6%)	309 (0.6%)
Urogenital	4271 (0.6%)	58 (1.3%)	705 (1.3%)	2294 (0.8%)	1032 (0.4%)	182 (0.2%)
Kidney	1483 (0.2%)	13 (0.3%)	262 (0.5%)	770 (0.3%)	361 (0.1%)	77 (0.1%)
Ureter	146 (<1%)	3 (0.1%)	35 (0.1%)	70 (<1%)	35 (<1%)	3 (<1%)
Bladder	2863 (0.4%)	45 (1.0%)	461 (0.9%)	1560 (0.5%)	687 (0.3%)	110 (0.1%)
Central nervous system	1136 (0.2%)	8 (0.2%)	121 (0.2%)	563 (0.2%)	335 (0.1%)	109 (0.1%)
Thyroid	389 (0.1%)	0 (0.0%)	30 (0.1%)	187 (0.1%)	122 (<1%)	50 (<1%)
Hematological	4258 (0.6%)	53 (1.1%)	603 (1.1%)	2215 (0.7%)	1163 (0.5%)	224 (0.2%)
Non-Hodgkin's lymphoma	1912 (0.3%)	19 (0.4%)	219 (0.4%)	984 (0.3%)	562 (0.2%)	128 (0.1%)
Multiple myeloma	1035 (0.1%)	16 (0.3%)	185 (0.4%)	511 (0.2%)	281 (0.1%)	42 (<1%)
Leukaemia	1743 (0.2%)	21 (0.5%)	243 (0.5%)	952 (0.3%)	449 (0.2%)	78 (0.1%)
Unknown origin	15205 (2.1%)	124 (2.7%)	1863 (3.5%)	7828 (2.6%)	4383 (1.7%)	1007 (0.9%)

There were 64,319 unique participants who developed cancer, but the sum of cancer cases may exceed this figure due to multiple cancer diagnoses over time.

**Supplement Table 4. Subgroup analyses for selected site-specific cancers by sex**

	Male		Female	
eGFR strata, ml/min/1.73m <sup>2</sup>	HR	95%CI	HR	95%CI
<b>Any-cancer</b>				
<30	<b>1.20</b>	<b>1.07,1.34</b>	<b>1.26</b>	<b>1.12,1.41</b>
30-59	<b>1.07</b>	<b>1.02,1.12</b>	<b>1.09</b>	<b>1.04,1.13</b>
60-89	0.99	0.96,1.02	1.01	0.98,1.04
90-104	Ref		Ref	
105+	<b>1.18</b>	<b>1.12,1.25</b>	0.97	0.91,1.02
<b>Skin cancer</b>				
<30	<b>1.32</b>	<b>1.08,1.60</b>	<b>1.44</b>	<b>1.20,1.73</b>
30-59	<b>1.19</b>	<b>1.10,1.29</b>	<b>1.18</b>	<b>1.10,1.27</b>
60-89	<b>1.09</b>	<b>1.03,1.15</b>	<b>1.12</b>	<b>1.06,1.18</b>
90-104	Ref		Ref	
105+	0.94	0.83,1.07	0.79	0.70,0.88
<b>Colon and rectum cancer</b>				
<30	0.87	0.58,1.31	0.99	0.68,1.44
30-59	0.85	0.73,0.98	1.01	0.88,1.16
60-89	0.88	0.80,0.97	0.95	0.86,1.05
90-104	Ref		Ref	
105+	<b>1.47</b>	<b>1.23,1.76</b>	1.17	0.95,1.44
<b>Lung cancer</b>				
<30	0.57	0.35,0.93	0.91	0.59,1.39
30-59	0.67	0.57,0.78	0.83	0.71,0.96
60-89	0.70	0.63,0.77	0.76	0.68,0.84
90-104	Ref		Ref	
105+	<b>2.06</b>	<b>1.72,2.48</b>	<b>1.41</b>	<b>1.14,1.75</b>
<b>Urogenital cancer</b>				
<30	<b>1.71</b>	<b>1.22,2.41</b>	<b>2.37</b>	<b>1.49,3.77</b>
30-59	<b>1.41</b>	<b>1.22,1.62</b>	<b>1.86</b>	<b>1.53,2.28</b>
60-89	<b>1.12</b>	<b>1.01,1.23</b>	1.15	0.99,1.33
90-104	Ref		Ref	
105+	1.13	0.92,1.38	1.04	0.75,1.43
<b>Hematological malignancy</b>				
<30	<b>1.74</b>	<b>1.16,2.60</b>	<b>1.62</b>	<b>1.08,2.43</b>
30-59	<b>1.39</b>	<b>1.18,1.64</b>	1.06	0.89,1.26
60-89	1.05	0.94,1.16	0.91	0.81,1.03
90-104	Ref		Ref	
105+	0.94	0.76,1.16	0.92	0.72,1.18

Model adjusted for age+ sex +comorbidity (hypertension, cardiovascular disease, diabetes, chronic obstructive pulmonary disease, rheumatoid disease, dementia, peptic ulcer disease, liver disease, hemiplegia/paraplegia, and chronic infections)

**Supplement Table 5. Subgroup analysis for selected site-specific cancers by age categories.**

	Age 40-49 (N=194,656)		Age 50-59 (N=184,619)		Age 60-69 (N=170,332)		Age 70+ (N=169,426)	
eGFR strata, ml/min/1.73m <sup>2</sup>	HR*	95%CI	HR*	95%CI	HR*	95%CI	HR*	95%CI
<b>Any-cancer</b>								
<30	<b>2.37</b>	<b>1.18,4.77</b>	<b>2.20</b>	<b>1.55,3.12</b>	1.51	<b>1.20,1.90</b>	1.19	<b>1.07,1.31</b>
30-59	<b>1.63</b>	<b>1.16,2.30</b>	<b>1.19</b>	<b>1.02,1.38</b>	1.05	0.98,1.12	<b>1.10</b>	<b>1.04,1.16</b>
60-89	0.97	0.89,1.05	1.01	0.97,1.05	0.99	0.96,1.01	1.02	0.97,1.07
90-104	Ref		Ref		Ref		Ref	
105+	0.96	0.90,1.03	<b>1.13</b>	<b>1.06,1.21</b>	<b>1.18</b>	<b>1.06,1.31</b>	1.06	0.77,1.44
<b>Skin cancer</b>								
<30	1.03	0.14,7.32	<b>3.81</b>	<b>2.20,6.60</b>	<b>2.54</b>	<b>1.77,3.65</b>	<b>1.37</b>	<b>1.16,1.62</b>
30-59	1.12	0.53,2.37	1.24	0.92,1.68	1.11	0.97,1.27	<b>1.32</b>	<b>1.20,1.46</b>
60-89	0.96	0.83,1.11	1.11	1.02,1.20	1.08	1.02,1.14	<b>1.24</b>	<b>1.13,1.36</b>
90-104	Ref		Ref		Ref		Ref	
105+	0.78	0.68,0.88	0.87	0.75,1.00	0.94	0.74,1.18	1.14	0.63,2.07
<b>Colon and rectum cancer</b>								
<30	-	-	1.45	0.36,5.83	1.25	0.56,2.80	0.86	0.62,1.18
30-59	2.79	1.02,7.62	1.16	0.69,1.95	0.96	0.76,1.22	0.88	0.75,1.02
60-89	1.00	0.73,1.37	0.89	0.77,1.03	0.93	0.84,1.02	0.87	0.76,1.00
90-104	Ref		Ref		Ref		Ref	
105+	<b>1.35</b>	<b>1.04,1.74</b>	<b>1.35</b>	<b>1.10,1.65</b>	1.25	0.89,1.75	1.62	0.76,3.44
<b>Lung cancer</b>								
<30	-	-	-	-	0.62	0.23,1.65	0.77	0.54,1.10
30-59	-	-	0.62	0.31,1.25	0.85	0.68,1.06	0.72	0.61,0.85
60-89	0.85	0.53,1.36	0.86	0.73,1.01	0.68	0.62,0.75	0.71	0.62,0.81
90-104	Ref		Ref		Ref		Ref	
105+	<b>1.61</b>	<b>1.14,2.29</b>	<b>1.63</b>	<b>1.32,2.00</b>	<b>2.20</b>	<b>1.73,2.79</b>	1.35	0.64,2.86
<b>Urogenital cancer</b>								
<30	<b>15.6</b>	<b>4.79,50.9</b>	<b>6.34</b>	<b>2.80,14.3</b>	1.28	0.53,3.10	<b>1.85</b>	<b>1.29,2.63</b>
30-59	<b>4.97</b>	<b>2.15,11.5</b>	1.46	0.82,2.61	1.48	1.18,1.87	<b>1.63</b>	<b>1.33,2.01</b>
60-89	0.91	0.64,1.31	1.17	0.98,1.39	1.09	0.98,1.22	1.18	0.97,1.43
90-104	Ref		Ref		Ref		Ref	
105+	1.06	0.78,1.42	1.18	0.90,1.55	0.99	0.64,1.53	0.75	0.19,3.05
<b>Hematological malignancy</b>								
<30	<b>11.3</b>	<b>3.48,36.6</b>	2.95	0.94,9.26	2.15	0.96,4.84	1.29	0.90,1.84
30-59	1.95	0.62,6.15	1.33	0.76,2.32	<b>1.35</b>	<b>1.04,1.75</b>	1.01	0.84,1.22
60-89	<b>1.34</b>	<b>1.02,1.75</b>	0.94	0.79,1.11	1.02	0.90,1.14	0.82	0.69,0.97
90-104	Ref		Ref		Ref		Ref	
105+	0.99	0.77,1.27	0.94	0.73,1.23	1.13	0.73,1.73	0.66	0.16,2.65
<b>Male prostate cancer</b>								
<30	-	-	1.11	0.36,3.45	0.86	0.46,1.61	<b>1.45</b>	<b>1.13,1.87</b>
30-59	2.70	0.99,7.37	1.05	0.70,1.56	0.96	0.82,1.13	<b>1.28</b>	<b>1.12,1.46</b>
60-89	0.85	0.61,1.18	1.06	0.96,1.17	1.05	0.99,1.11	<b>1.17</b>	<b>1.04,1.32</b>
90-104	Ref		Ref		Ref		Ref	
105+	0.92	0.69,1.23	1.03	0.88,1.22	0.69	0.53,0.91	0.49	0.18,1.30
<b>Female breast cancer</b>								
<30	1.49	0.21,10.7	1.56	0.50,4.86	1.00	0.37,2.68	0.86	0.56,1.31
30-59	0.85	0.32,2.28	0.94	0.61,1.44	1.06	0.87,1.30	1.04	0.86,1.25
60-89	0.96	0.82,1.13	1.05	0.95,1.16	1.00	0.92,1.09	1.08	0.91,1.27
90-104	Ref		Ref		Ref		Ref	
105+	0.90	0.79,1.03	0.96	0.81,1.13	0.89	0.61,1.30	0.50	0.070,3.59

Model adjusted for age+ sex + comorbidity

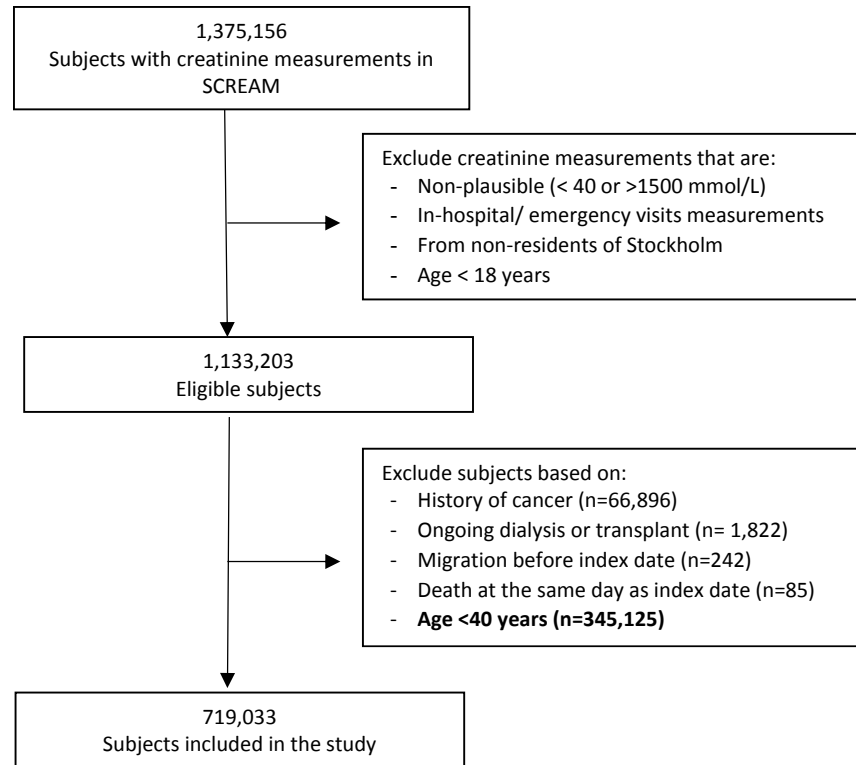
Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

**Supplement Table 6. Hazard ratios overall and for skin cancers by eGFR strata.**

eGFR strata, ml/min/1.73m <sup>2</sup>	Total follow-up		Splitting follow-up time			
	HR*	95%CI	0-1 year		1 years +	
	HR*	95%CI	HR*	95%CI	HR*	95%CI
<b>Skin cancer</b>						
<30	<b>1.40</b>	<b>1.23,1.60</b>	<b>1.29</b>	<b>1.02,1.64</b>	<b>1.45</b>	<b>1.23,1.70</b>
30-59	<b>1.19</b>	<b>1.13,1.26</b>	<b>1.23</b>	<b>1.10,1.38</b>	<b>1.18</b>	<b>1.11,1.25</b>
60-89	<b>1.11</b>	<b>1.07,1.15</b>	<b>1.12</b>	<b>1.03,1.22</b>	<b>1.11</b>	<b>1.06,1.16</b>
90-104	<b>Ref</b>		<b>Ref</b>		<b>Ref</b>	
105+	<b>0.87</b>	<b>0.80,0.94</b>	0.89	0.74,1.06	0.86	0.78,0.95
<b>Melanoma</b>						
<30	0.77	0.46,1.29	0.64	0.20,2.04	0.82	0.46,1.47
30-59	1.05	0.90,1.22	1.16	0.83,1.63	1.02	0.86,1.21
60-89	1.02	0.93,1.12	1.11	0.90,1.38	1.00	0.90,1.11
90-104	<b>Ref</b>		<b>Ref</b>		<b>Ref</b>	
105+	0.83	0.70,0.99	0.76	0.52,1.12	0.86	0.70,1.05
<b>Non-melanoma</b>						
<30	<b>1.47</b>	<b>1.28,1.68</b>	<b>1.34</b>	<b>1.05,1.72</b>	<b>1.52</b>	<b>1.29,1.79</b>
30-59	<b>1.22</b>	<b>1.15,1.30</b>	<b>1.26</b>	<b>1.12,1.42</b>	<b>1.21</b>	<b>1.13,1.29</b>
60-89	<b>1.13</b>	<b>1.08,1.18</b>	<b>1.13</b>	<b>1.04,1.24</b>	<b>1.13</b>	<b>1.08,1.18</b>
90-104	<b>Ref</b>		<b>Ref</b>		<b>Ref</b>	
105+	0.87	0.80,0.96	0.95	0.78,1.16	0.85	0.77,0.95

Model adjusted for age+ sex +comorbidity (hypertension, cardiovascular disease, diabetes, chronic obstructive pulmonary disease, rheumatoid disease, dementia, peptic ulcer disease, liver disease, hemiplegia/paraplegia, and chronic infections)

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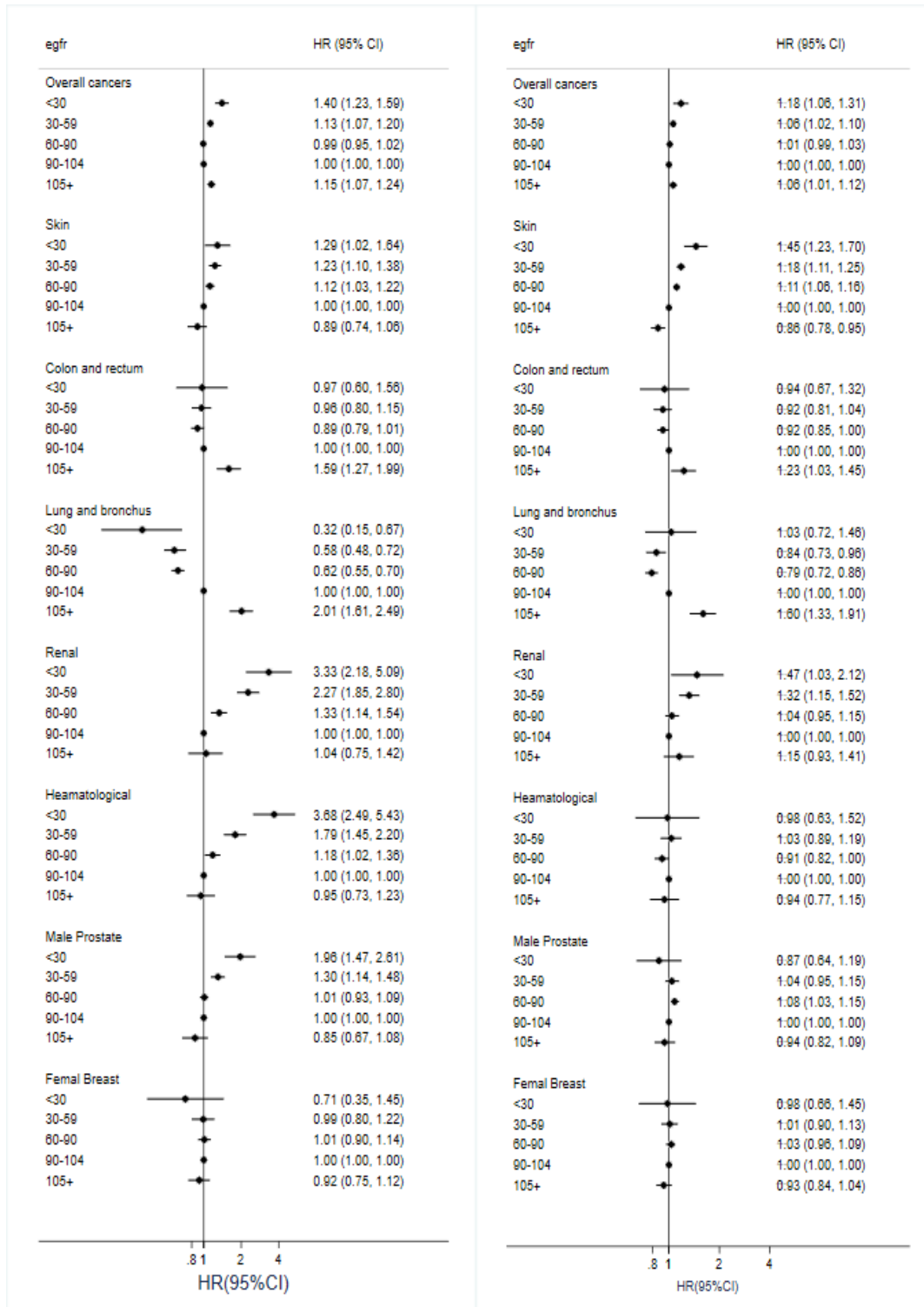


**Supplement Figure 1.** Flow chart of study participants.



**A) Follow-up time 0-12 months**

**B) Follow-up time >12 months**



**Supplement Figure 2.** Hazard ratios for any-type and selected site-specific cancers by eGFR strata splitting follow up time into two time-periods.