

Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eAppendix. Covariates

Baseline data were obtained from the records of nationwide health screenings performed between 2005 and 2010 generally at 2-year intervals. The covariates were determined using the averaged values for 2005–2010, except for the values of HDL and LDL cholesterol and eGFR, which were averaged for 2009–2010.

First, outlier data were excluded from the health screening records.

- (a) serum creatinine <0.3 mg/dl or >15.0 mg/dl
- (b) systolic blood pressure <90 mm Hg or >200 mm Hg
- (c) fasting blood glucose <30 mg/dl or >900 mg/dl
- (d) total cholesterol <130 mg/dl or >320 mg/dl
- (e) HDL cholesterol <20 mg/dl or >100 mg/dl
- (f) LDL cholesterol <30 mg/dl or >300 mg/dl
- (g) body mass index <10.0 kg/m² or >50.0 kg/m²
- (h) alcohol drinks per drinking day >35 drinks

Baseline age was classified into 5-year age categories (40–44, 45–49, 50–54, 55–59, 60–64, 65–69, and 70–74 years). Sex, albuminuria, and family history of cardiovascular disease were categorized dichotomously.

Predicted 10-year risk of cardiovascular disease was calculated using the 2018 revised Pooled Cohort Equations¹ to compare the overall burden of conventional risk factors between groups.

Medication statuses of antihypertensives and statins were categorized into 3 groups (never, irregular, or regular). Regular use was considered when the days of prescription were for >1/2 of medication period (from the initiation of medication to the baseline), irregular use when those were for ≤1/2 of the period, and never use when those were never for ≥90 days per year.

Systolic blood pressure was categorized into 8 groups (90–105, 105–114, 115–124, 125–134, 135–144, 145–154, 155–164, or 165–200 mm Hg) primarily with 10 mm Hg intervals.

Total cholesterol was categorized into 5 groups (130–159, 160–199, 200–239, 240–279, or 280–320 mg/dl), HDL cholesterol into 3 groups (20–39, 40–59, or 60–100 mg/dl), and LDL cholesterol into 5 groups (30–99, 100–129, 130–159, 160–189, or 190–250 mg/dl), based on the ATP III classifications.²

Body mass index was categorized into 5 groups (underweight, 10.0–18.4; low-normal weight, 18.5–22.9; high-normal weight, 23.0–24.9, overweight, 25.0–29.9; and obesity, 30.0–50.0 kg/m²) referring to the WHO classifications.³

Income levels were determined by income based insurance contributions. The vigintile values of insurance contributions were averaged from 2005 to 2010. The averaged values were categorized into 5 groups (1–4, 5–8, 9–12, 13–16, or 17–20).

Smoking status was categorized into 3 groups (never, former, or current smoker). Exercise frequency was divided into 4 categories (<1, 1–2, 3–4, or ≥5 days per week). Drinking amount was categorized into 6 groups (0.0, 0.1–3.4, 3.5–7.4, 7.5–14.4, 14.5–28.4, or ≥28.5 drinks per week) with log-scale intervals incorporating the cutoff values for the NIAAA's definition of low-risk drinking.⁴

eTable 1. National Health Insurance Service Codes for Patient Treatment and Diagnosis

	NHIS Code
Antidiabetic^a	DPP-4 inhibitor, 5008, 5011, 5023, 5029, 5070, 5071, 5137, 5185, 5186, 5196, 5205, 5206, 5207, 5238, 5247, 6133, 6164, 6191, 6242, 6273, 6303, 6304, 6305, 6306, 6320, 6356, 6357, 6396, 6418, 6419, 6420, 6450, 6453, 6484, 6485, 6486, 6499, 6500, 6501, 6541, 6646, 6647, 6648; Glitazone, 3480, 4319, 4527, 4529, 4612, 4691, 4718, 4888, 4889, 4890, 4981, 5255, 5256, 5259, 6303, 6304, 6305, 6306, 6538, 6539, 6540, 6541, 6557; GLP-1 agonist, 5121, 6266, 6397, 6398, 6414, 6445, 6667, 6670 Insulin, 1183, 1701, 1702, 1703, 1704, 1705, 1706, 1752, 1753, 2156, 2157, 3278, 4413, 4618, 4849, 4887, 5074, 6267, 6268, 6667, 6670; Meglitinide, 3795, 4302, 4861, 5188, 6319, 6321, 6372, 6449; Metformin, 1915, 4211, 4434, 4435, 4527, 4529, 4612, 4691, 4718, 4719, 4742, 4743, 4972, 4981, 4986, 5023, 5029, 5070, 5071, 5137, 5185, 5186, 5188, 5196, 5205, 5206, 5207, 5236, 5237, 5238, 5247, 6319, 6320, 6321, 6356, 6357, 6372, 6398, 6414, 6418, 6419, 6420, 6449, 6450, 6484, 6485, 6486, 6490, 6491, 6492, 6493, 6494, 6495, 6499, 6500, 6501, 6538, 6539, 6540, 6541, 6557, 6718, 6719, 6720, 6721, 6725, 6726, 6727, 6728, 6729, 6730, 6738, 6833, 6834; SGLT2 inhibitor, 5273, 6282, 6361, 6398, 6414, 6490, 6491, 6492, 6493, 6494, 6495, 6743; Sulfonylurea, 1320, 1654, 1655, 1656, 1657, 1658, 1659, 4174, 4211, 4434, 4435, 4719, 4742, 4743, 4888, 4889, 4890, 4972, 4986, 5255, 5256; α -glucosidase inhibitor, 1006, 2490, 4062, 5236, 5237
Antihypertensive^a	ACE inhibitor, 1042, 1147, 1229, 1330, 1409, 1516, 1635, 1734, 1845, 1968, 2113, 2219, 2224, 2310, 2350, 2351, 2424, 2622, 2623, 3787, 3859, 4028, 4403, 4407, 4408, 4470, 4471, 4472, 4486, 4487, 4536, 4537, 4660, 4901, 4979, 4992, 4993, 5016, 5104, 5562; AG II antagonist, 1226, 1773, 1857, 2471, 2625, 3564, 3788, 3789, 3857, 3858, 4237, 4292, 4426, 4432, 4433, 4605, 4685, 4774, 4869, 4891, 4928, 4929, 4958, 5005, 5006, 5026, 5027, 5030, 5115, 5116, 5117, 5136, 5139, 5152, 5197, 5198, 5199, 5200, 5201, 5209, 5212, 5213, 5214, 5220, 5222, 5223, 5224, 5226, 5227, 5228, 5229, 5230, 5231, 5232, 5233, 5234, 5240, 5241, 5250, 5251, 5252, 5253, 5263, 5264, 5265, 5268, 5269, 5270, 5271, 5475, 5476, 5477, 5478, 5479, 5480, 5822, 5824, 6231, 6294, 6295, 6296, 6297, 6298, 6299, 6300, 6301, 6302, 6313, 6316, 6317, 6328, 6329, 6330, 6349, 6350, 6351, 6352, 6374, 6375, 6376, 6441, 6442, 6448, 6519, 6520, 6521, 6527, 6529, 6530, 6531, 6624, 6628, 6629, 6630, 6635, 6636, 6637, 6638, 6735, 6736, 6827, 6828, 6829; Ca-antagonist, 1076, 1140, 1151, 1331, 1457, 1575, 1789, 1803, 1820, 1880, 2010, 2011, 2017, 2024, 2476, 2624, 3562, 4412, 4470, 4471, 4472, 4598, 4599, 4646, 4660, 4708, 4723, 4724, 4725, 4762, 4797, 4832, 4865, 4928, 4929, 4958, 4959, 5005, 5006, 5027, 5030, 5115, 5116, 5117, 5139, 5189, 5197, 5198, 5199, 5200, 5201, 5212, 5213, 5214, 5222, 5223, 5224, 5226, 5227, 5228, 5229, 5230, 5231, 5232, 5233, 5234, 5282, 5475, 5476, 5477, 5478, 5479, 5480, 5822, 5824, 6145, 6231, 6294, 6295, 6296, 6313, 6328, 6329, 6330, 6374, 6375, 6376, 6448, 6519, 6520, 6521, 6527, 6529, 6530, 6531, 6628, 6629, 6630, 6635, 6636, 6637, 6638, 6827, 6828, 6829; Central sympatholytic, 1365, 1927, 1975, 2231, 2631; Direct vasodilator, 1707, 1961, 2293, 4236, 4606; Thiazide, 1708, 1744, 2447, 2620, 2621, 2622, 2623, 2625, 2626, 2627, 2628, 2630, 3564, 3787, 3789, 3857, 3858, 4237, 4273, 4274, 4403, 4407, 4408, 4426, 4432, 4433, 4486, 4487, 4513, 4536, 4537, 4554, 4555, 4605, 4698, 4699, 4700, 4774, 4869, 4891, 4901, 4979, 4992, 4993, 5026, 5136, 5197, 5198, 5200, 5220, 5268, 5562, 6628, 6629, 6630, 6635, 6636, 6637, 6638, 6735, 6736, 6827, 6828, 6829; α antagonist, 1200, 1491, 1749, 2168, 2355, 2629, 4414, 4834; β blocker, 1079, 1114, 1168, 1170, 1179, 1250, 1370, 1802, 2023, 2098, 2620, 2621, 2624, 2626, 4273, 4274, 4554, 4555, 4601, 4602, 4698, 4699, 4700, 4831, 4895
Statin^a	Atorvastatin, 1115, 4723, 4724, 4725, 5022, 5189, 5240, 5241, 5270, 5271, 6145, 6338, 6339, 6346, 6348, 6718, 6719, 6720, 6721, 6738; Cervastatin, 1304; Fluvastatin, 1624; Lovastatin, 1858, 1859; Pitavastatin, 4709, 6349, 6350, 6351, 6352, 6793; Pravastatin, 2166, 5193; Rosuvastatin, 4540, 5250, 5251, 5252, 5253, 5263, 5264, 5265, 5269, 6297, 6298, 6299, 6300, 6301, 6302, 6316, 6317, 6407, 6408, 6409, 6441, 6442, 6634, 6646, 6647, 6648, 6725, 6726, 6727, 6728, 6729, 6730, 6833, 6834; Simvastatin, 2278, 4710, 4711, 5078, 6314, 6315
Renal replacement therapy	Haemodialysis, O7020, O9991; Peritoneal dialysate, 3214, 3216, 3218, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3240, 3243, 3244, 3245, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3259, 3260, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3601, 3602, 3603, 3659, 3660, 3661, 3662, 3663, 3666, 3667, 3668, 3669, 3808, 3809, 4008, 4009, 4010, 4095, 4096, 4097, 4098, 4099, 4229, 4230, 4231, 4232, 4234, 4235, 4311, 4312, 4313, 4490, 4491, 4492, 4498, 4499, 4500, 4637, 4639, 4640, 4647, 4648, 4845, 4846, 4847, 4935, 4936, 4949, 4950, 4951, 5096, 5097, 5098, 5107, 5108, 5109, 5110, 5111, 5135, 5161, 5162, 5163, 6657, 6658, 6659, 6816, 6817, 6818, 6819, 6820, 6821; Kidney transplantation, R3280
CCU admission	NHIS clause code, 02; and NHIS item code, 03
Coronary revascularization	Percutaneous coronary angioplasty, M6551, M6552, M6553, M6554; Percutaneous coronary stent insertion, M6561, M6562, M6563, M6564, M6565, M6566, M6567; Percutaneous coronary thrombolysis or thrombectomy, M6634, M6638; Percutaneous coronary atherectomy, M6571, M6572; Coronary artery bypass graft, O1647, OA641, OA642; Coronary artery endarterectomy, O1830
Cerebral or carotid revascularization	Percutaneous cerebral angioplasty, M6593, M6599; Percutaneous cerebral stent insertion, M6601; Percutaneous cerebral thrombolysis or thrombectomy, M6630, M6636;

n	Percutaneous carotid angioplasty, M6594; Percutaneous carotid stent insertion, M6602; Percutaneous carotid thrombolysis or thrombectomy, M6635, M6637; Transluminal carotid atherectomy, O0226; Carotid endarterectomy, O0227
Diagnosis	Acute ischemic stroke, I63–I66; Acute coronary syndrome, I21–I24; Cardiovascular disease, I00–I99; Chronic kidney disease, N18; Kidney transplant status, Z94.0

^a The codes for combination drugs are repeated in corresponding cells.

ACE, angiotensin-converting-enzyme; AG, angiotensin; CCU, critical care unit; DPP-4 dipeptidyl peptidase-4; GLP-1, glucagon-like peptide-1; NHIS, National Health Insurance Service; SGLT2, sodium-glucose transport protein 2.

eTable 2. Time-lagged Covariates for Subsequent Years

Year of Outcome Variable	Year of Time-Varying Covariate		Period for Fixed Covariate
Clinical Endpoint	Time-Averaged FBG	Antidiabetic Use Status	Baseline Value
2011	2005–2010	2010	2005–2010
2012	2005–2011	2011	2005–2010
2013	2005–2012	2012	2005–2010
2014	2005–2013	2013	2005–2010
2015	2005–2014	2014	2005–2010
2016	2005–2015	2015	2005–2010
2017	2005–2016	2016	2005–2010
2018	2005–2017	2017	2005–2010
2019	2005–2018	2018	2005–2010

FBG, fasting blood glucose.

eTable 3. Hazard Ratios of On-Treatment Fasting Blood Glucose Level in Albuminuria, Decreased Estimated Glomerular Filtration Rate, and General Populations^a

Outcome	CKD with Dipstick Albuminuria		CKD with eGFR <60 ml/min/1.73 m ²		General Population	
	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)
Major kidney events^b						
<80 mg/dl	145 / 2776	1.92 (1.62–2.28)	148 / 5335	1.61 (1.36–1.91)	26 / 2893	1.58 (0.86–2.90)
80–<100 mg/dl	743 / 25972	1.40 (1.29–1.53)	814 / 53661	1.30 (1.20–1.42)	195 / 35462	1.18 (0.93–1.50)
100–<110 mg/dl	728 / 36427	1.09 (1.00–1.19)	727 / 65301	1.06 (0.97–1.16)	198 / 49892	1.08 (0.86–1.35)
110–<126 mg/dl	1624 / 94672	1.00	1424 / 139532	1.00	448 / 120943	1.00
126–<140 mg/dl	1416 / 95870	0.87 (0.81–0.94)	1125 / 107785	0.96 (0.88–1.03)	435 / 105114	0.84 (0.69–1.02)
140–<160 mg/dl	1803 / 117326	0.90 (0.84–0.96)	1265 / 102855	1.01 (0.93–1.08)	459 / 106019	0.90 (0.74–1.09)
160–<180 mg/dl	1525 / 80701	1.10 (1.03–1.18)	869 / 55867	1.13 (1.04–1.23)	330 / 59492	1.28 (1.04–1.57)
≥180 mg/dl	3136 / 119779	1.49 (1.40–1.58)	1676 / 68642	1.50 (1.39–1.61)	696 / 72532	1.61 (1.33–1.95)
Doubling serum creatinine						
<80 mg/dl	91 / 2742	1.60 (1.29–1.98)	78 / 5113	1.15 (0.91–1.45)	15 / 2724	1.53 (0.91–2.57)
80–<100 mg/dl	498 / 23390	1.37 (1.24–1.53)	469 / 46344	1.23 (1.10–1.38)	157 / 31435	1.45 (1.20–1.75)
100–<110 mg/dl	500 / 31779	1.09 (0.98–1.21)	435 / 55027	1.06 (0.94–1.19)	162 / 43622	1.06 (0.89–1.28)
110–<126 mg/dl	1170 / 82600	1.00	872 / 116910	1.00	375 / 105354	1.00
126–<140 mg/dl	1040 / 82824	0.88 (0.80–0.95)	701 / 89797	0.96 (0.87–1.06)	376 / 90835	1.09 (0.95–1.26)
140–<160 mg/dl	1393 / 101188	0.93 (0.86–1.01)	791 / 85663	1.00 (0.91–1.10)	395 / 91578	1.08 (0.93–1.24)
160–<180 mg/dl	1177 / 70003	1.12 (1.03–1.22)	539 / 46539	1.10 (0.99–1.23)	286 / 51214	1.27 (1.09–1.49)
≥180 mg/dl	2266 / 105499	1.44 (1.34–1.55)	1010 / 58693	1.40 (1.28–1.54)	555 / 62821	1.94 (1.69–2.22)
Kidney failure^c						
<80 mg/dl	102 / 2847	1.49 (1.21–1.82)	122 / 5384	1.52 (1.26–1.83)	12 / 2901	2.06 (1.14–3.72)
80–<100 mg/dl	563 / 26631	1.31 (1.18–1.45)	687 / 54193	1.30 (1.18–1.43)	84 / 35860	1.34 (1.03–1.75)
100–<110 mg/dl	549 / 37430	1.07 (0.96–1.18)	610 / 65954	1.06 (0.96–1.17)	83 / 50420	1.04 (0.80–1.35)
110–<126 mg/dl	1168 / 97041	1.00	1181 / 140918	1.00	176 / 122273	1.00
126–<140 mg/dl	957 / 98133	0.87 (0.80–0.94)	904 / 108907	0.94 (0.86–1.02)	143 / 106399	0.89 (0.71–1.11)
140–<160 mg/dl	1148 / 120239	0.86 (0.80–0.94)	1009 / 103940	0.98 (0.90–1.06)	151 / 107421	0.79 (0.63–0.98)
160–<180 mg/dl	966 / 82882	1.07 (0.98–1.16)	714 / 56582	1.12 (1.02–1.23)	133 / 60341	1.08 (0.86–1.36)
≥180 mg/dl	2001 / 123276	1.45 (1.34–1.56)	1358 / 69495	1.46 (1.34–1.58)	346 / 73678	2.08 (1.71–2.51)
Major cardiovascular events						
<80 mg/dl	53 / 3105	1.79 (1.35–2.37)	74 / 5650	1.51 (1.19–1.92)	14 / 2912	1.09 (0.64–1.85)
80–<100 mg/dl	269 / 27976	1.14 (0.99–1.32)	512 / 55420	1.18 (1.07–1.32)	182 / 35791	1.22 (1.03–1.45)
100–<110 mg/dl	318 / 38544	1.04 (0.92–1.19)	546 / 66785	1.08 (0.98–1.20)	239 / 50206	1.17 (1.00–1.37)
110–<126 mg/dl	727 / 98902	1.00	1056 / 142205	1.00	478 / 121588	1.00
126–<140 mg/dl	747 / 99343	1.06 (0.96–1.17)	878 / 109972	1.07 (0.98–1.17)	423 / 105757	1.03 (0.90–1.17)
140–<160 mg/dl	983 / 121678	1.17 (1.06–1.29)	986 / 105176	1.24 (1.13–1.35)	505 / 106735	1.22 (1.07–1.38)
160–<180 mg/dl	707 / 84323	1.24 (1.12–1.38)	605 / 57699	1.37 (1.24–1.51)	352 / 59959	1.53 (1.33–1.76)
≥180 mg/dl	1337 / 126354	1.61 (1.47–1.77)	999 / 71998	1.78 (1.63–1.95)	505 / 73589	1.87 (1.64–2.13)
All-cause mortality						
<80 mg/dl	123 / 3162	1.63 (1.36–1.96)	218 / 5732	1.73 (1.51–1.99)	79 / 2933	2.34 (1.86–2.94)
80–<100 mg/dl	776 / 28391	1.27 (1.16–1.38)	1443 / 56213	1.24 (1.16–1.32)	514 / 36099	1.30 (1.17–1.44)
100–<110 mg/dl	840 / 39073	1.06 (0.98–1.15)	1450 / 67673	1.07 (1.01–1.14)	612 / 50613	1.13 (1.02–1.24)
110–<126 mg/dl	1881 / 100391	1.00	2838 / 144197	1.00	1259 / 122688	1.00
126–<140 mg/dl	1718 / 100886	0.96 (0.90–1.03)	2301 / 111596	1.05 (1.00–1.11)	1035 / 106771	0.97 (0.89–1.05)
140–<160 mg/dl	2131 / 123670	1.03 (0.96–1.09)	2283 / 106951	1.10 (1.04–1.16)	1135 / 107846	1.07 (0.99–1.16)

mg/dl						
160–<180 mg/dl	1597 / 85633	1.20 (1.12–1.28)	1464 / 58774	1.31 (1.22–1.39)	728 / 60686	1.28 (1.16–1.40)
≥180 mg/dl	3061 / 128708	1.65 (1.55–1.75)	2502 / 73543	1.82 (1.72–1.92)	1163 / 74550	1.81 (1.67–1.97)
	eGFR ≥60 ml/min/1.73 m²		eGFR <60 ml/min/1.73 m²		General Population	
New-onset albuminuria						
<80 mg/dl	46 / 1627	2.13 (1.59–2.87)	123 / 2660	1.58 (1.32–1.90)	57 / 1881	1.97 (1.51–2.57)
80–<100 mg/dl	312 / 22288	0.97 (0.86–1.10)	933 / 31555	1.11 (1.03–1.20)	423 / 25700	1.06 (0.95–1.18)
100–<110 mg/dl	483 / 32539	1.04 (0.94–1.16)	1090 / 39611	1.04 (0.96–1.11)	607 / 36604	1.04 (0.95–1.15)
110–<126 mg/dl	1199 / 79081	1.00	2282 / 83922	1.00	1433 / 87792	1.00
126–<140 mg/dl	1173 / 68029	1.02 (0.95–1.11)	1797 / 62089	1.05 (0.98–1.11)	1355 / 74110	1.10 (1.02–1.18)
140–<160 mg/dl	1285 / 66208	1.13 (1.04–1.22)	1817 / 55690	1.15 (1.08–1.23)	1470 / 72006	1.19 (1.10–1.28)
160–<180 mg/dl	830 / 35162	1.37 (1.25–1.49)	1027 / 28122	1.28 (1.18–1.37)	921 / 37993	1.42 (1.30–1.54)
≥180 mg/dl	1335 / 39526	2.08 (1.92–2.25)	1495 / 30101	1.80 (1.69–1.93)	1495 / 42518	2.10 (1.95–2.26)

^a The hazard ratios were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and baseline covariates of age, sex, eGFR, proteinuria, time of antihypertensive initiation, antihypertensive and statin use statuses, fasting glucose, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking.

^b Major kidney event was a composite of kidney failure or doubling of serum creatinine.

^c Kidney failure was identified as dialysis for ≥90 days per year, kidney transplantation, or death from CKD. CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; FBG, fasting blood glucose.

eTable 4. Hazard Ratios of On-Treatment Fasting Blood Glucose Level by Albuminuria Level^a

Outcome	Dipstick Albumin $\geq 2+$		Dipstick Albumin 1+ or trace		No Albuminuria	
	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)
Major kidney events^b						
<80 mg/dl	105 / 1337	1.68 (1.37–2.06)	40 / 1439	2.32 (1.68–3.20)	14 / 2657	1.88 (1.09–3.22)
80–<100 mg/dl	518 / 10839	1.31 (1.18–1.45)	225 / 15133	1.46 (1.25–1.70)	125 / 32957	1.45 (1.17–1.79)
100–<110 mg/dl	494 / 14226	1.11 (1.00–1.24)	234 / 22201	1.04 (0.90–1.22)	129 / 46231	1.07 (0.87–1.32)
110–<126 mg/dl	1056 / 36139	1.00	568 / 58533	1.00	286 / 111727	1.00
126–<140 mg/dl	931 / 37825	0.87 (0.80–0.95)	485 / 58045	0.85 (0.76–0.97)	298 / 95457	1.21 (1.03–1.42)
140–<160 mg/dl	1217 / 46672	0.92 (0.85–1.00)	586 / 70654	0.84 (0.75–0.94)	283 / 94390	1.16 (0.98–1.36)
160–<180 mg/dl	1040 / 33824	1.10 (1.01–1.20)	485 / 46877	1.04 (0.92–1.18)	191 / 51106	1.44 (1.19–1.73)
≥ 180 mg/dl	2152 / 54411	1.39 (1.29–1.50)	984 / 65368	1.53 (1.37–1.70)	368 / 60486	2.33 (1.99–2.74)
Doubling serum creatinine						
<80 mg/dl	63 / 1362	1.39 (1.07–1.80)	28 / 1380	2.10 (1.43–3.08)	11 / 2484	1.49 (0.81–2.73)
80–<100 mg/dl	350 / 9994	1.32 (1.16–1.51)	148 / 13396	1.31 (1.08–1.58)	111 / 29186	1.39 (1.11–1.74)
100–<110 mg/dl	320 / 12462	1.08 (0.95–1.24)	180 / 19317	1.09 (0.92–1.29)	113 / 40477	1.03 (0.82–1.28)
110–<126 mg/dl	727 / 31637	1.00	443 / 50963	1.00	262 / 97244	1.00
126–<140 mg/dl	666 / 32853	0.88 (0.79–0.97)	374 / 49971	0.84 (0.73–0.97)	274 / 82562	1.21 (1.02–1.43)
140–<160 mg/dl	926 / 40286	0.97 (0.88–1.07)	467 / 60902	0.84 (0.74–0.96)	255 / 81542	1.13 (0.95–1.34)
160–<180 mg/dl	787 / 29566	1.13 (1.02–1.25)	390 / 40437	1.05 (0.91–1.20)	172 / 43939	1.44 (1.18–1.75)
≥ 180 mg/dl	1537 / 48515	1.35 (1.23–1.48)	729 / 56984	1.44 (1.27–1.62)	309 / 52137	2.20 (1.85–2.62)
Kidney failure^c						
<80 mg/dl	76 / 1376	1.31 (1.03–1.66)	26 / 1471	1.84 (1.23–2.75)	3 / 2664	2.31 (0.71–7.49)
80–<100 mg/dl	410 / 11237	1.16 (1.03–1.31)	153 / 15394	1.57 (1.29–1.91)	29 / 33299	1.93 (1.21–3.08)
100–<110 mg/dl	407 / 14815	1.08 (0.96–1.22)	142 / 22615	1.03 (0.85–1.26)	30 / 46674	1.50 (0.95–2.38)
110–<126 mg/dl	850 / 37415	1.00	318 / 59626	1.00	47 / 112798	1.00
126–<140 mg/dl	709 / 39094	0.86 (0.78–0.95)	248 / 59039	0.84 (0.71–0.99)	50 / 96544	1.25 (0.84–1.86)
140–<160 mg/dl	862 / 48363	0.86 (0.78–0.95)	286 / 71876	0.82 (0.70–0.96)	55 / 95516	1.28 (0.86–1.89)
160–<180 mg/dl	719 / 35130	1.03 (0.94–1.14)	247 / 47752	1.07 (0.91–1.27)	46 / 51725	1.90 (1.26–2.86)
≥ 180 mg/dl	1469 / 56485	1.30 (1.19–1.41)	532 / 66791	1.69 (1.46–1.95)	124 / 61293	4.25 (3.00–6.01)
Major cardiovascular events						
<80 mg/dl	27 / 1574	1.32 (0.89–1.95)	26 / 1531	2.53 (1.69–3.78)	12 / 2653	1.14 (0.64–2.03)
80–<100 mg/dl	152 / 12417	1.03 (0.86–1.25)	117 / 15559	1.24 (1.00–1.53)	153 / 33125	1.24 (1.03–1.50)
100–<110 mg/dl	164 / 15892	0.95 (0.79–1.14)	154 / 22652	1.16 (0.95–1.40)	206 / 46374	1.21 (1.03–1.44)
110–<126 mg/dl	394 / 39222	1.00	333 / 59680	1.00	402 / 111971	1.00
126–<140 mg/dl	381 / 40498	0.97 (0.84–1.11)	366 / 58845	1.15 (0.99–1.34)	359 / 95810	1.07 (0.92–1.23)
140–<160 mg/dl	510 / 50117	1.07 (0.93–1.22)	473 / 71561	1.27 (1.10–1.46)	406 / 94738	1.24 (1.08–1.43)
160–<180 mg/dl	350 / 36688	1.02 (0.88–1.18)	357 / 47635	1.50 (1.29–1.74)	267 / 51236	1.57 (1.34–1.84)
≥ 180 mg/dl	752 / 59399	1.39 (1.23–1.58)	585 / 66955	1.83 (1.59–2.11)	379 / 60790	2.02 (1.75–2.34)
All-cause mortality						
<80 mg/dl	82 / 1604	1.70 (1.35–2.13)	41 / 1558	1.44 (1.05–1.97)	72 / 2667	2.49 (1.96–3.17)
80–<100 mg/dl	433 / 12625	1.20 (1.07–1.35)	343 / 15766	1.31 (1.15–1.48)	442 / 33373	1.30 (1.17–1.46)
100–<110 mg/dl	433 / 16123	1.01 (0.90–1.14)	407 / 22950	1.11 (0.99–1.25)	513 / 46740	1.11 (1.00–1.23)
110–<126 mg/dl	967 / 40000	1.00	914 / 60391	1.00	1083 / 112882	1.00
126–<140 mg/dl	889 / 41287	0.95 (0.86–1.04)	829 / 59599	0.97 (0.88–1.07)	877 / 96657	0.98 (0.89–1.07)
140–<160 mg/dl	1095 / 51101	0.99 (0.91–1.08)	1036 / 72569	1.06 (0.97–1.16)	915 / 95632	1.07 (0.98–1.17)

160–<180 mg/dl	856 / 37352	1.14 (1.04–1.25)	741 / 48281	1.23 (1.12–1.36)	573 / 51826	1.31 (1.19–1.46)
≥180 mg/dl	1743 / 60704	1.54 (1.42–1.67)	1318 / 68004	1.71 (1.57–1.87)	875 / 61507	1.88 (1.71–2.06)

^a The hazard ratios were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and baseline covariates of age, sex, eGFR, proteinuria, time of antihypertensive initiation, antihypertensive and statin use statuses, fasting glucose, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking.

^b Major kidney event was a composite of kidney failure or doubling of serum creatinine.

^c Kidney failure was identified as dialysis for ≥90 days per year, kidney transplantation, or death from chronic kidney disease. FBG, fasting blood glucose; eGFR, estimated glomerular filtration rate.

eTable 5. Hazard Ratios of On-Treatment Fasting Blood Glucose Level by Estimated Glomerular Filtration Rate^a

Outcome	15 to <45 ml/min/1.73 m ²		45 to <60 ml/min/1.73 m ²		≥60 ml/min/1.73 m ²	
	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)
Major kidney events^b						
<80 mg/dl	105 / 1621	1.38 (1.13–1.70)	43 / 3714	2.08 (1.53–2.85)	14 / 2378	1.89 (1.10–3.23)
80–<100 mg/dl	540 / 11905	1.22 (1.09–1.36)	274 / 41756	1.43 (1.24–1.65)	108 / 29715	1.27 (1.02–1.59)
100–<110 mg/dl	437 / 11742	1.02 (0.91–1.14)	290 / 53559	1.10 (0.95–1.26)	126 / 43151	1.01 (0.82–1.25)
110–<126 mg/dl	821 / 23928	1.00	603 / 115604	1.00	309 / 106498	1.00
126–<140 mg/dl	608 / 18269	0.95 (0.86–1.06)	517 / 89516	0.96 (0.85–1.08)	328 / 94538	1.13 (0.97–1.32)
140–<160 mg/dl	654 / 18074	0.98 (0.88–1.08)	611 / 84781	1.04 (0.93–1.17)	344 / 95435	1.13 (0.97–1.32)
160–<180 mg/dl	425 / 10305	1.02 (0.91–1.15)	444 / 45562	1.25 (1.10–1.41)	243 / 53781	1.32 (1.11–1.56)
≥180 mg/dl	839 / 13845	1.29 (1.16–1.42)	837 / 54797	1.77 (1.59–1.97)	511 / 65874	2.12 (1.83–2.47)
Doubling serum creatinine						
<80 mg/dl	48 / 1686	0.87 (0.65–1.18)	30 / 3427	1.90 (1.31–2.76)	12 / 2212	1.60 (0.89–2.85)
80–<100 mg/dl	287 / 10565	1.13 (0.97–1.31)	182 / 35779	1.32 (1.11–1.57)	103 / 26457	1.27 (1.02–1.60)
100–<110 mg/dl	240 / 10162	1.03 (0.88–1.20)	195 / 44865	1.08 (0.91–1.28)	117 / 38011	1.00 (0.81–1.24)
110–<126 mg/dl	450 / 20315	1.00	422 / 96595	1.00	292 / 93214	1.00
126–<140 mg/dl	333 / 15471	0.92 (0.80–1.07)	368 / 74326	0.99 (0.86–1.14)	307 / 82064	1.13 (0.96–1.33)
140–<160 mg/dl	361 / 15576	0.91 (0.79–1.05)	430 / 70087	1.08 (0.94–1.23)	326 / 82680	1.15 (0.98–1.35)
160–<180 mg/dl	236 / 9000	0.95 (0.81–1.11)	303 / 37539	1.24 (1.06–1.44)	225 / 46454	1.33 (1.11–1.59)
≥180 mg/dl	466 / 12650	1.18 (1.03–1.35)	544 / 46043	1.63 (1.43–1.86)	435 / 57139	2.02 (1.73–2.36)
Kidney failure^c						
<80 mg/dl	99 / 1647	1.40 (1.13–1.73)	23 / 3737	1.72 (1.12–2.62)	2 / 2383	1.30 (0.31–5.38)
80–<100 mg/dl	506 / 12100	1.22 (1.09–1.36)	181 / 42093	1.46 (1.22–1.74)	16 / 30040	1.02 (0.59–1.77)
100–<110 mg/dl	416 / 11977	1.03 (0.91–1.16)	194 / 53977	1.10 (0.93–1.30)	21 / 43621	0.84 (0.52–1.38)
110–<126 mg/dl	776 / 24360	1.00	405 / 116558	1.00	67 / 107656	1.00
126–<140 mg/dl	559 / 18559	0.94 (0.84–1.05)	345 / 90348	0.92 (0.80–1.07)	53 / 95676	0.73 (0.51–1.05)
140–<160 mg/dl	608 / 18346	0.98 (0.88–1.09)	401 / 85594	0.95 (0.83–1.09)	65 / 96736	0.75 (0.53–1.05)
160–<180 mg/dl	400 / 10474	1.04 (0.92–1.18)	314 / 46108	1.19 (1.02–1.38)	65 / 54553	1.07 (0.76–1.52)
≥180 mg/dl	760 / 14118	1.26 (1.14–1.40)	598 / 55368	1.73 (1.52–1.98)	188 / 66924	2.22 (1.66–2.99)
Major cardiovascular events						
<80 mg/dl	36 / 1898	1.58 (1.12–2.24)	38 / 3752	1.46 (1.05–2.02)	10 / 2366	1.14 (0.61–2.14)
80–<100 mg/dl	186 / 13397	1.16 (0.96–1.39)	326 / 42023	1.20 (1.05–1.37)	131 / 29848	1.23 (1.01–1.51)
100–<110 mg/dl	172 / 13132	1.11 (0.92–1.34)	374 / 53653	1.08 (0.95–1.22)	179 / 43347	1.17 (0.98–1.40)
110–<126 mg/dl	305 / 26424	1.00	751 / 115781	1.00	370 / 106828	1.00
126–<140 mg/dl	256 / 20099	1.12 (0.95–1.32)	622 / 89873	1.05 (0.94–1.17)	338 / 94942	1.02 (0.88–1.19)
140–<160 mg/dl	288 / 19987	1.27 (1.08–1.49)	698 / 85189	1.22 (1.10–1.35)	395 / 95963	1.19 (1.04–1.38)
160–<180 mg/dl	164 / 11719	1.21 (1.00–1.47)	441 / 45980	1.43 (1.27–1.61)	292 / 54078	1.59 (1.36–1.86)
≥180 mg/dl	297 / 16239	1.56 (1.32–1.84)	702 / 55759	1.88 (1.69–2.09)	408 / 66475	1.91 (1.65–2.22)
All-cause mortality						
<80 mg/dl	92 / 1945	1.45 (1.17–1.80)	126 / 3787	2.00 (1.67–2.40)	52 / 2385	2.17 (1.64–2.88)
80–<100 mg/dl	556 / 13678	1.19 (1.07–1.33)	887 / 42535	1.26 (1.16–1.36)	368 / 30078	1.31 (1.16–1.48)
100–<110 mg/dl	453 / 13352	1.02 (0.91–1.14)	997 / 54321	1.10 (1.02–1.18)	468 / 43664	1.16 (1.04–1.30)
110–<126 mg/dl	878 / 26856	1.00	1960 / 117341	1.00	960 / 107773	1.00
126–<140 mg/dl	705 / 20500	1.08 (0.97–1.19)	1596 / 91096	1.04 (0.98–1.12)	826 / 95779	0.98 (0.89–1.07)
140–<160 mg/dl	679 / 20428	1.06 (0.96–1.17)	1604 / 86523	1.11 (1.04–1.19)	907 / 96875	1.08 (0.99–1.19)

160–<180 mg/dl	448 / 11959	1.22 (1.09–1.37)	1016 / 46815	1.34 (1.24–1.45)	584 / 54702	1.29 (1.16–1.43)
≥180 mg/dl	847 / 16688	1.69 (1.53–1.86)	1655 / 56846	1.88 (1.76–2.01)	926 / 67306	1.83 (1.66–2.01)

^a The hazard ratios were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and baseline covariates of age, sex, eGFR, proteinuria, time of antihypertensive initiation, antihypertensive and statin use statuses, fasting glucose, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking.

^b Major kidney event was a composite of kidney failure or doubling of serum creatinine.

^c Kidney failure was identified as dialysis for ≥90 days per year, kidney transplantation, or death from chronic kidney disease. FBG, fasting blood glucose; eGFR, estimated glomerular filtration rate.

eTable 6. Hazard Ratios of On-Treatment Fasting Blood Glucose Level Among Participants with Chronic Kidney Disease^a

Outcome	CKD G1-2 with Albuminuria		CKD G3-4 with No Albuminuria		CKD G3-4 with Albuminuria	
	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)	no. of event / patient-yr	hazard ratio (95% CI)
Major kidney events^b						
<80 mg/dl	40 / 1710	2.51 (1.82–3.46)	43 / 4269	1.75 (1.28–2.40)	105 / 1066	1.48 (1.20–1.81)
80–<100 mg/dl	236 / 18171	1.47 (1.26–1.70)	307 / 45860	1.50 (1.30–1.73)	507 / 7801	1.19 (1.06–1.32)
100–<110 mg/dl	268 / 27298	1.09 (0.95–1.26)	267 / 56172	1.17 (1.01–1.35)	460 / 9129	1.00 (0.89–1.12)
110–<126 mg/dl	704 / 74919	1.00	504 / 119779	1.00	920 / 19753	1.00
126–<140 mg/dl	682 / 78141	0.88 (0.79–0.98)	391 / 90056	1.02 (0.89–1.16)	734 / 17729	0.91 (0.83–1.01)
140–<160 mg/dl	985 / 97914	0.96 (0.87–1.06)	447 / 83443	1.16 (1.02–1.31)	818 / 19412	0.91 (0.83–1.01)
160–<180 mg/dl	923 / 68313	1.24 (1.12–1.37)	267 / 43479	1.26 (1.09–1.47)	602 / 12388	1.03 (0.93–1.15)
≥180 mg/dl	1916 / 100939	1.72 (1.57–1.88)	456 / 49802	1.89 (1.66–2.16)	1220 / 18840	1.32 (1.21–1.44)
Doubling serum creatinine						
<80 mg/dl	31 / 1570	2.24 (1.56–3.22)	18 / 3941	1.25 (0.78–2.02)	60 / 1172	1.08 (0.83–1.42)
80–<100 mg/dl	200 / 16100	1.45 (1.23–1.70)	171 / 39054	1.41 (1.17–1.71)	298 / 7290	1.12 (0.97–1.29)
100–<110 mg/dl	224 / 23820	1.06 (0.91–1.24)	159 / 47068	1.13 (0.93–1.37)	276 / 7959	1.03 (0.89–1.19)
110–<126 mg/dl	611 / 65322	1.00	313 / 99632	1.00	559 / 17278	1.00
126–<140 mg/dl	584 / 67631	0.87 (0.78–0.98)	245 / 74604	1.01 (0.85–1.19)	456 / 15193	0.93 (0.82–1.05)
140–<160 mg/dl	877 / 84442	0.99 (0.89–1.10)	275 / 68917	1.14 (0.97–1.34)	516 / 16746	0.91 (0.81–1.03)
160–<180 mg/dl	806 / 59085	1.26 (1.13–1.40)	168 / 35621	1.29 (1.07–1.56)	371 / 10918	0.99 (0.86–1.13)
≥180 mg/dl	1533 / 88254	1.62 (1.47–1.79)	277 / 41448	1.83 (1.55–2.15)	733 / 17245	1.22 (1.09–1.36)
Kidney failure^c						
<80 mg/dl	17 / 1751	2.25 (1.38–3.68)	37 / 4288	2.03 (1.44–2.87)	85 / 1096	1.29 (1.03–1.62)
80–<100 mg/dl	104 / 18614	1.46 (1.17–1.82)	228 / 46176	1.56 (1.32–1.85)	459 / 8017	1.18 (1.05–1.32)
100–<110 mg/dl	122 / 27979	1.10 (0.89–1.36)	183 / 56503	1.18 (0.98–1.41)	427 / 9451	1.01 (0.90–1.14)
110–<126 mg/dl	330 / 76631	1.00	343 / 120508	1.00	838 / 20410	1.00
126–<140 mg/dl	315 / 79878	0.86 (0.73–1.00)	262 / 90652	1.01 (0.86–1.19)	642 / 18255	0.90 (0.81–1.00)
140–<160 mg/dl	427 / 100308	0.85 (0.74–0.98)	288 / 84009	1.08 (0.92–1.27)	721 / 19931	0.91 (0.82–1.00)
160–<180 mg/dl	427 / 70108	1.16 (1.01–1.35)	175 / 43808	1.18 (0.98–1.42)	539 / 12774	1.05 (0.94–1.17)
≥180 mg/dl	979 / 103915	1.79 (1.57–2.03)	336 / 50125	2.06 (1.76–2.40)	1022 / 19361	1.26 (1.14–1.38)
Major cardiovascular events						
<80 mg/dl	20 / 1777	1.73 (1.10–2.71)	41 / 4322	1.29 (0.94–1.77)	33 / 1328	1.87 (1.30–2.70)
80–<100 mg/dl	134 / 18675	1.14 (0.94–1.39)	377 / 46119	1.21 (1.06–1.37)	135 / 9301	1.11 (0.90–1.37)
100–<110 mg/dl	174 / 27944	1.03 (0.86–1.23)	402 / 56185	1.10 (0.97–1.24)	144 / 10600	1.06 (0.86–1.29)
110–<126 mg/dl	448 / 76338	1.00	777 / 119641	1.00	279 / 22564	1.00
126–<140 mg/dl	464 / 79452	1.00 (0.88–1.14)	595 / 90081	1.03 (0.92–1.15)	283 / 19891	1.15 (0.98–1.36)
140–<160 mg/dl	675 / 99875	1.17 (1.04–1.32)	678 / 83373	1.27 (1.14–1.41)	308 / 21803	1.14 (0.97–1.35)
160–<180 mg/dl	493 / 70027	1.23 (1.08–1.41)	391 / 43403	1.42 (1.26–1.61)	214 / 14296	1.22 (1.02–1.46)
≥180 mg/dl	928 / 104346	1.62 (1.44–1.82)	590 / 49990	1.89 (1.70–2.11)	409 / 22008	1.55 (1.32–1.81)
All-cause mortality						
<80 mg/dl	55 / 1797	1.96 (1.49–2.58)	150 / 4367	1.92 (1.62–2.27)	68 / 1365	1.38 (1.08–1.78)
80–<100 mg/dl	379 / 18879	1.33 (1.19–1.50)	1046 / 46701	1.26 (1.17–1.36)	397 / 9512	1.16 (1.02–1.31)
100–<110 mg/dl	448 / 28251	1.08 (0.97–1.20)	1058 / 56851	1.09 (1.01–1.17)	392 / 10822	1.02 (0.90–1.15)
110–<126 mg/dl	1097 / 77337	1.00	2054 / 121143	1.00	784 / 23054	1.00
126–<140 mg/dl	1038 / 80527	0.94 (0.86–1.02)	1621 / 91237	1.07 (1.00–1.14)	680 / 20359	1.01 (0.91–1.12)
140–<160 mg/dl	1419 / 101315	1.05 (0.97–1.14)	1571 / 84596	1.14 (1.07–1.22)	712 / 22355	0.98 (0.89–1.09)

160–<180 mg/dl	1071 / 71020	1.20 (1.10–1.31)	938 / 44161	1.34 (1.24–1.45)	526 / 14613	1.19 (1.06–1.33)
≥180 mg/dl	2049 / 106092	1.68 (1.56–1.81)	1490 / 50918	1.94 (1.82–2.08)	1012 / 22616	1.57 (1.42–1.72)

^a The hazard ratios were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and baseline covariates of age, sex, eGFR, proteinuria, time of antihypertensive initiation, antihypertensive and statin use statuses, fasting glucose, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking.

^b Major kidney event was a composite of kidney failure or doubling of serum creatinine.

^c Kidney failure was identified as dialysis for ≥90 days per year, kidney transplantation, or death from CKD. FBG, fasting blood glucose; CKD, chronic kidney disease.

eTable 7. Hazard Ratios of On-Treatment Fasting Blood Glucose Level Among Participants With No Chronic Kidney Disease^a

Outcome	No CKD	
	no. of event / patient-yr	hazard ratio (95% CI)
Major kidney events^b		
<80 mg/dl	11 / 2218	1.67 (0.91–3.07)
80–<100 mg/dl	94 / 28073	1.29 (1.01–1.65)
100–<110 mg/dl	100 / 40439	1.01 (0.80–1.27)
110–<126 mg/dl	239 / 99356	1.00
126–<140 mg/dl	259 / 86597	1.23 (1.03–1.47)
140–<160 mg/dl	239 / 85849	1.15 (0.96–1.38)
160–<180 mg/dl	164 / 46695	1.45 (1.19–1.78)
≥180 mg/dl	315 / 55571	2.31 (1.93–2.75)
Doubling serum creatinine		
<80 mg/dl	10 / 2073	1.42 (0.75–2.69)
80–<100 mg/dl	91 / 25004	1.27 (1.00–1.63)
100–<110 mg/dl	95 / 35667	0.98 (0.77–1.25)
110–<126 mg/dl	230 / 86859	1.00
126–<140 mg/dl	251 / 75252	1.24 (1.04–1.49)
140–<160 mg/dl	231 / 74382	1.15 (0.96–1.39)
160–<180 mg/dl	153 / 40309	1.44 (1.17–1.77)
≥180 mg/dl	276 / 48077	2.20 (1.83–2.64)
Kidney failure^c		
<80 mg/dl	1 / 2223	2.04 (0.26–15.69)
80–<100 mg/dl	8 / 28371	1.39 (0.61–3.16)
100–<110 mg/dl	7 / 40847	0.82 (0.35–1.93)
110–<126 mg/dl	22 / 100338	1.00
126–<140 mg/dl	18 / 87590	0.88 (0.47–1.64)
140–<160 mg/dl	24 / 86916	1.07 (0.60–1.91)
160–<180 mg/dl	32 / 47281	2.42 (1.40–4.20)
≥180 mg/dl	86 / 56347	5.10 (3.13–8.31)
Major cardiovascular events		
<80 mg/dl	8 / 2213	1.08 (0.53–2.18)
80–<100 mg/dl	118 / 28188	1.27 (1.03–1.58)
100–<110 mg/dl	161 / 40568	1.21 (1.00–1.46)
110–<126 mg/dl	324 / 99570	1.00
126–<140 mg/dl	297 / 86913	1.06 (0.91–1.24)
140–<160 mg/dl	334 / 86208	1.23 (1.05–1.43)
160–<180 mg/dl	232 / 46821	1.62 (1.37–1.93)
≥180 mg/dl	324 / 55826	2.04 (1.74–2.40)
All-cause mortality		
<80 mg/dl	50 / 2225	2.38 (1.78–3.17)
80–<100 mg/dl	336 / 28394	1.32 (1.16–1.50)
100–<110 mg/dl	417 / 40856	1.16 (1.03–1.31)
110–<126 mg/dl	861 / 100363	1.00
126–<140 mg/dl	723 / 87635	0.98 (0.89–1.09)
140–<160 mg/dl	774 / 86966	1.10 (1.00–1.21)
160–<180 mg/dl	483 / 47349	1.32 (1.18–1.48)
≥180 mg/dl	724 / 56481	1.85 (1.67–2.05)

^a The hazard ratios were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and baseline covariates of age, sex, eGFR, proteinuria, time of antihypertensive initiation, antihypertensive and statin use statuses, fasting glucose, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking.

^b Major kidney event was a composite of kidney failure or doubling of serum creatinine.

^c Kidney failure was identified as dialysis for ≥90 days per year, kidney transplantation, or death from CKD.

FBG, fasting blood glucose; CKD, chronic kidney disease.

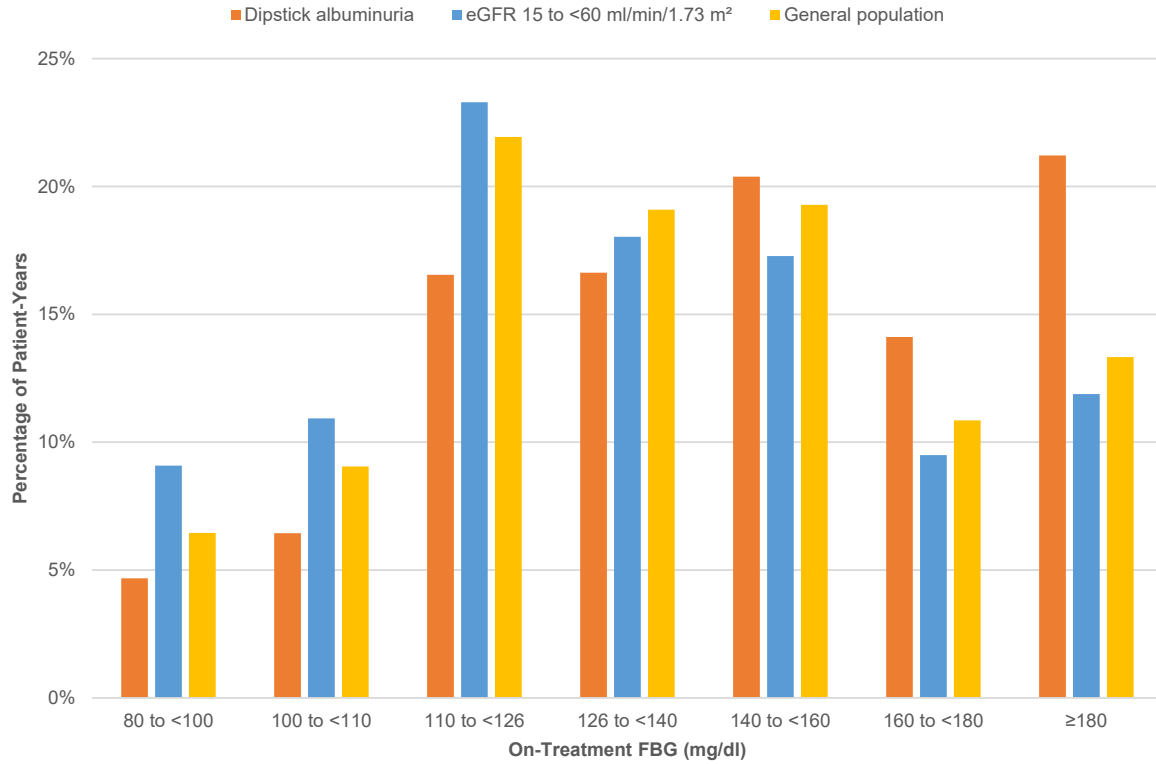
eTable 8. Time-Dependent Interactions of On-Treatment Fasting Blood Glucose Level and a Log Function of Follow-Up Time

Outcome	CKD with Dipstick Albuminuria		CKD with eGFR <60 ml/min/1.73 m ²		General Population	
	Wald chi-square	P for interaction	Wald chi-square	P for interaction	Wald chi-square	P for interaction
Major kidney event^a						
<80 mg/dl	0.438	0.508	0.894	0.344	0.370	0.543
80-<100 mg/dl	1.815	0.178	4.364	0.037	0.530	0.467
100-<110 mg/dl	0.814	0.367	1.497	0.221	0.455	0.500
110-<126 mg/dl ^b	.	.	.	.	.	.
126-<140 mg/dl	0.901	0.342	0.526	0.468	0.654	0.419
140-<160 mg/dl	1.938	0.164	0.852	0.356	0.266	0.606
160-<180 mg/dl	2.439	0.118	1.073	0.300	4.359	0.037
≥180 mg/dl	9.954	0.002	1.310	0.252	18.773	<.0001
All-cause mortality						
<80 mg/dl	0.134	0.715	1.457	0.227	0.540	0.462
80-<100 mg/dl	2.419	0.120	1.959	0.162	4.413	0.036
100-<110 mg/dl	3.374	0.066	2.157	0.142	2.259	0.133
110-<126 mg/dl ^b	.	.	.	.	.	.
126-<140 mg/dl	3.900	0.048	2.128	0.145	9.646	0.002
140-<160 mg/dl	0.567	0.452	0.773	0.379	0.085	0.771
160-<180 mg/dl	0.501	0.479	0.003	0.957	0.273	0.602
≥180 mg/dl	0.000	0.984	0.931	0.335	2.981	0.084

^a Major kidney event was a composite of doubling of serum creatinine, end-stage kidney disease, or death from CKD.

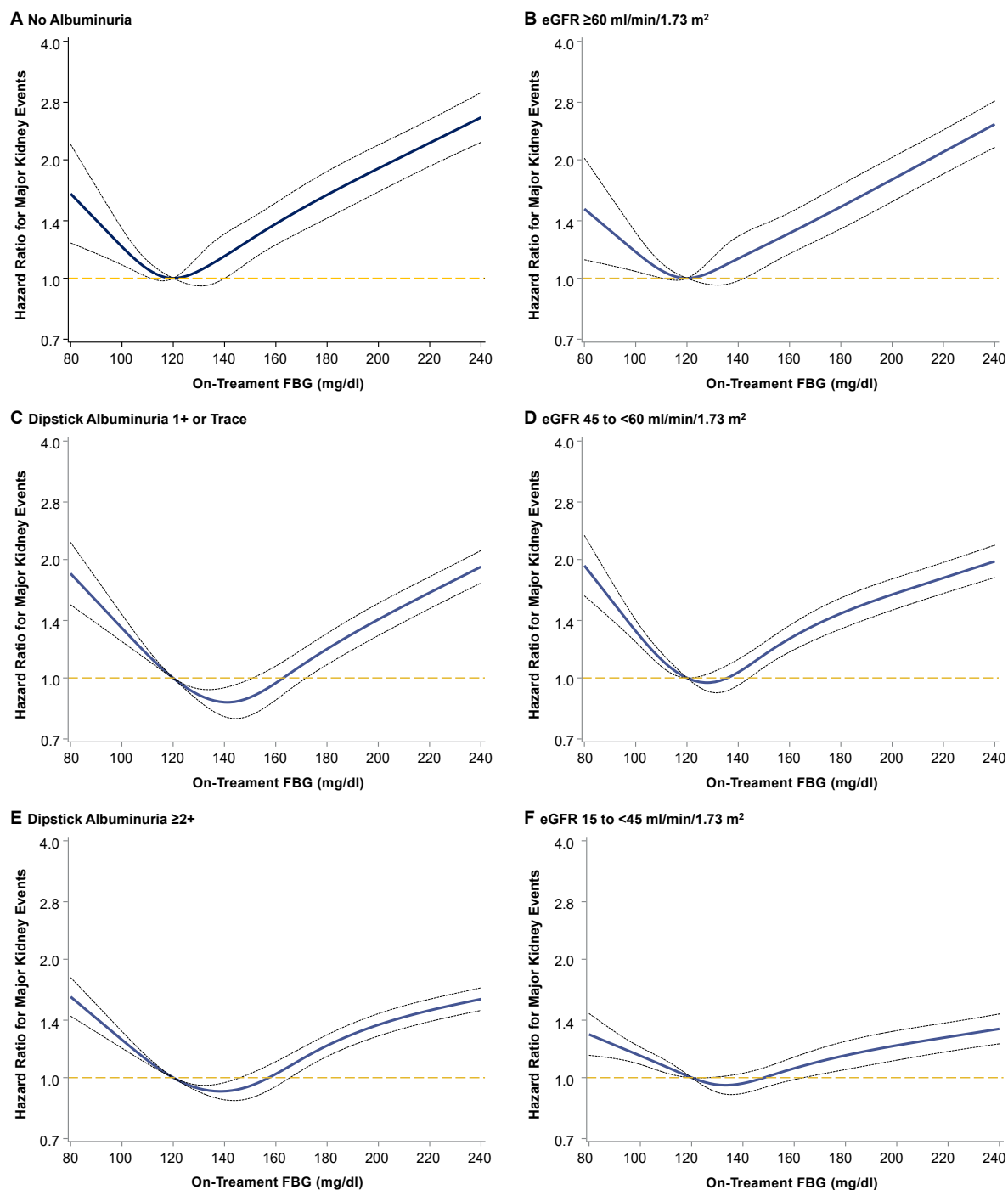
^b The on-treatment FBG 110 to <126 mg/dl was set as the reference.

CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; FBG, fasting blood glucose.



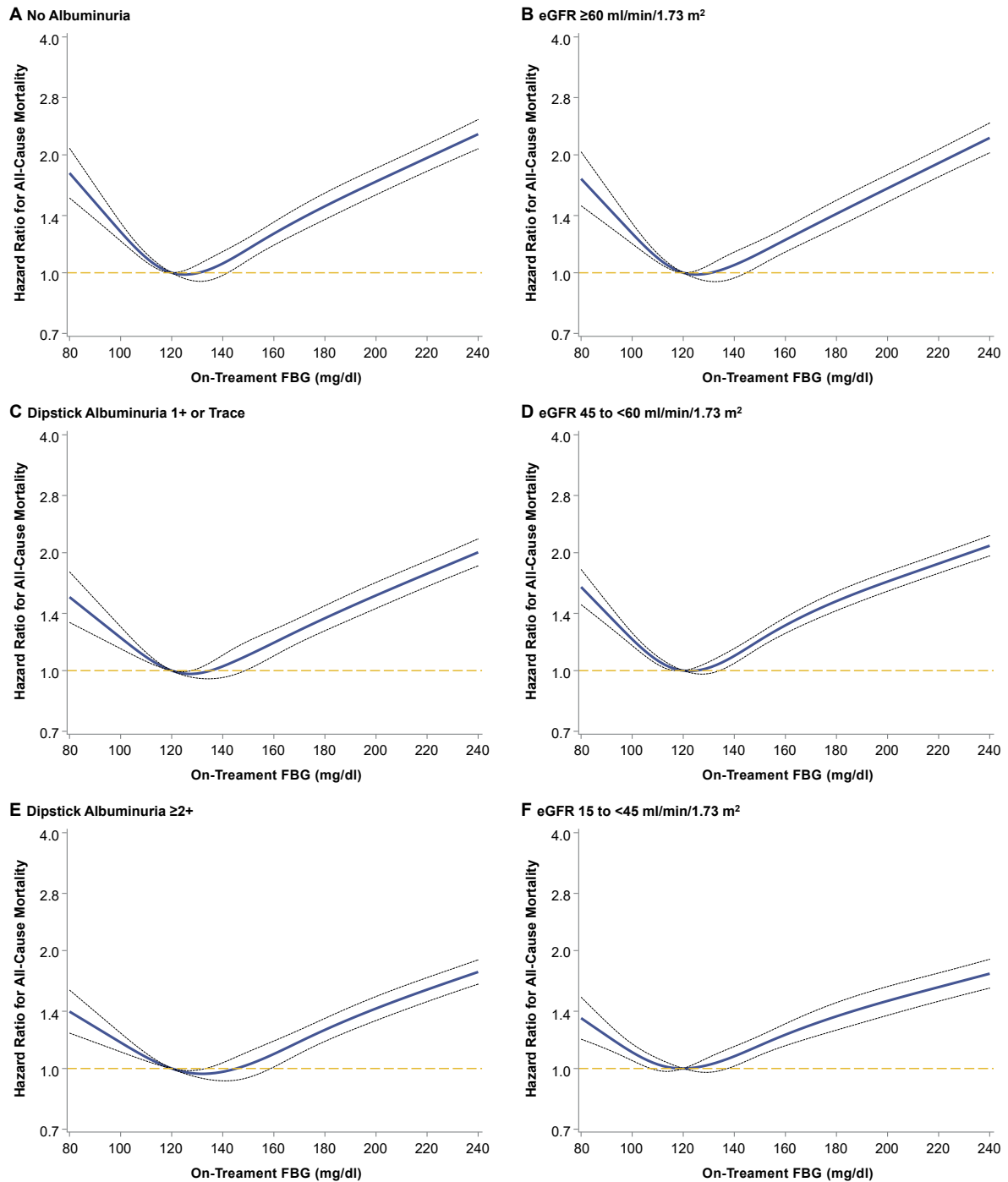
eFigure 1. Distribution of Follow-Up Fasting Blood Glucose Level in Albuminuria, Decreased Estimated Glomerular Filtration Rate, and General Populations

The percentages of patient-years (Y-axis) across on-treatment FBG categories (X-axis) were calculated in each of the albuminuria, decreased eGFR, and general populations. The rare FBG <80 mg/dl is excluded from the plots. eGFR, estimated glomerular filtration rate; FBG, fasting blood glucose.



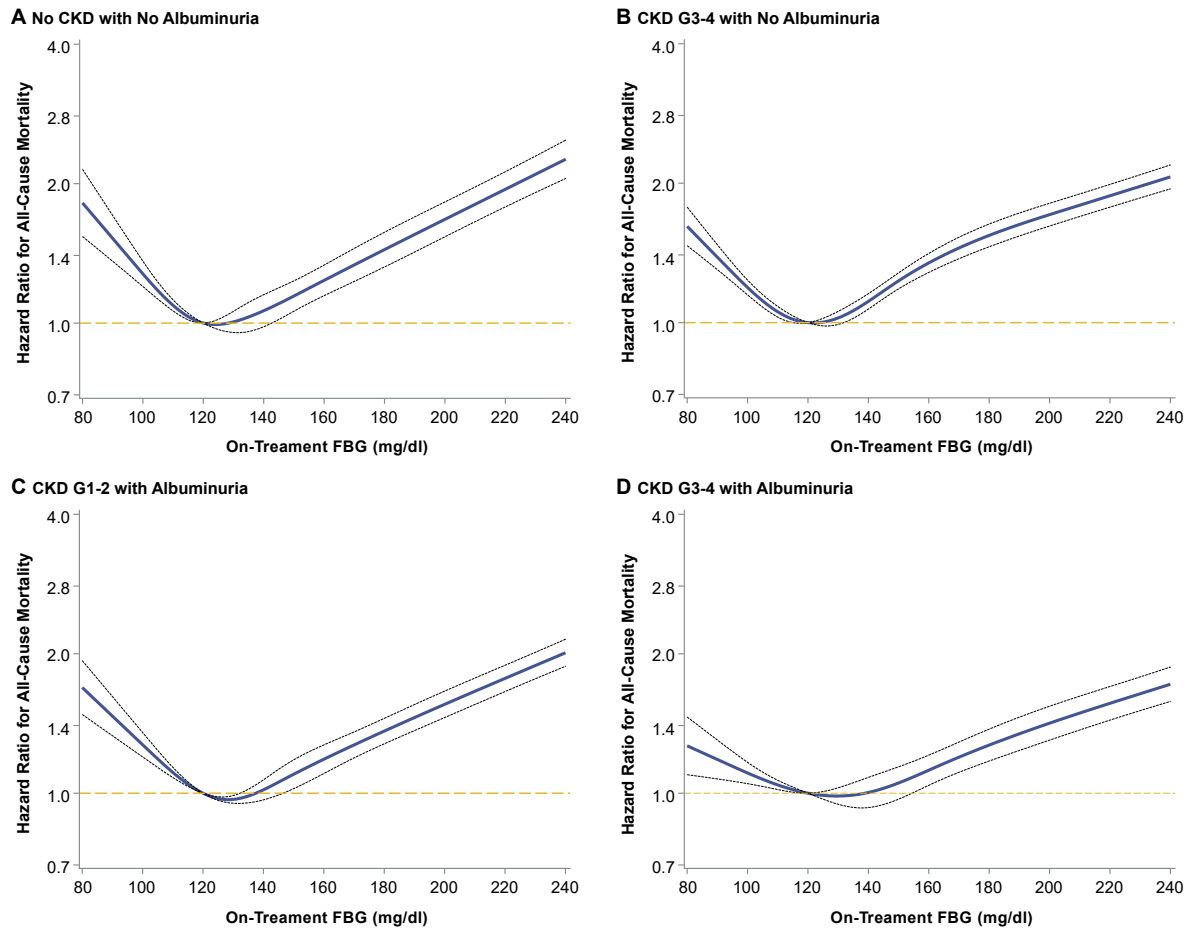
eFigure 2. Association of On-Treatment Fasting Blood Glucose Level and Risk of Major Kidney Events by Albuminuria or Estimated Glomerular Filtration Rate Level

The hazard ratios (solid line) and 95% CIs (dotted line) were estimated using a restricted cubic spline function. The on-treatment FBG 120 mg/dl was set as the reference (dashed line). The major kidney event was a composite of doubling serum creatinine, end-stage kidney disease, or death from chronic kidney disease. Analyses were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and fixed covariates of baseline age, sex, eGFR, proteinuria, time of antidiabetic initiation, antihypertensive and statin use statuses, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking. eGFR, estimated glomerular filtration rate; FBG, fasting blood glucose.



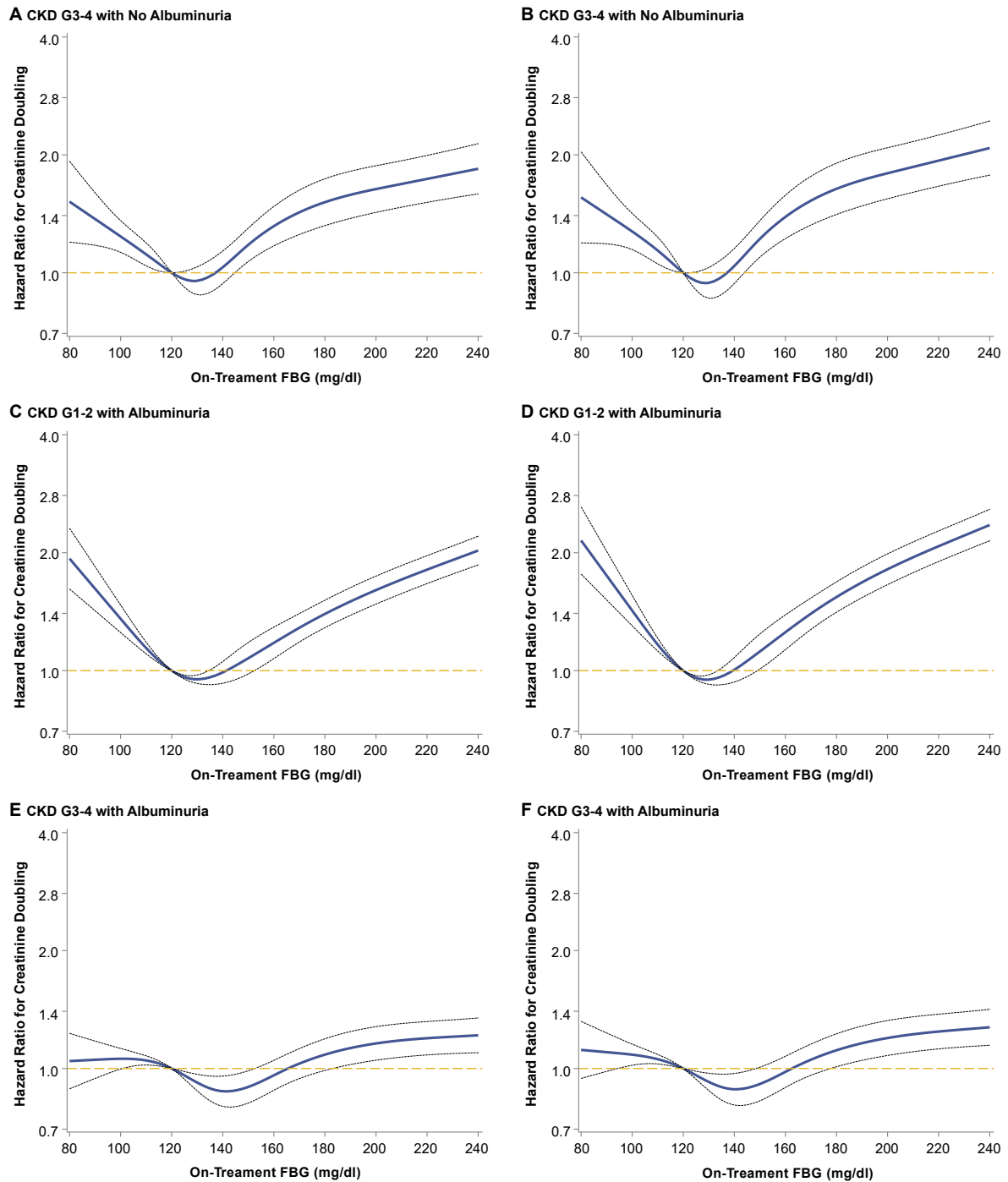
eFigure 3. Association of On-Treatment Fasting Blood Glucose Level and All-Cause Mortality by Albuminuria or Estimated Glomerular Filtration Rate Level

The hazard ratios (solid line) and 95% CIs (dotted line) were estimated using a restricted cubic spline function. The on-treatment FBG 120 mg/dl was set as the reference (dashed line). Analyses were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and fixed covariates of baseline age, sex, eGFR, proteinuria, time of antidiabetic initiation, antihypertensive and statin use statuses, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking. eGFR, estimated glomerular filtration rate; FBG, fasting blood glucose.



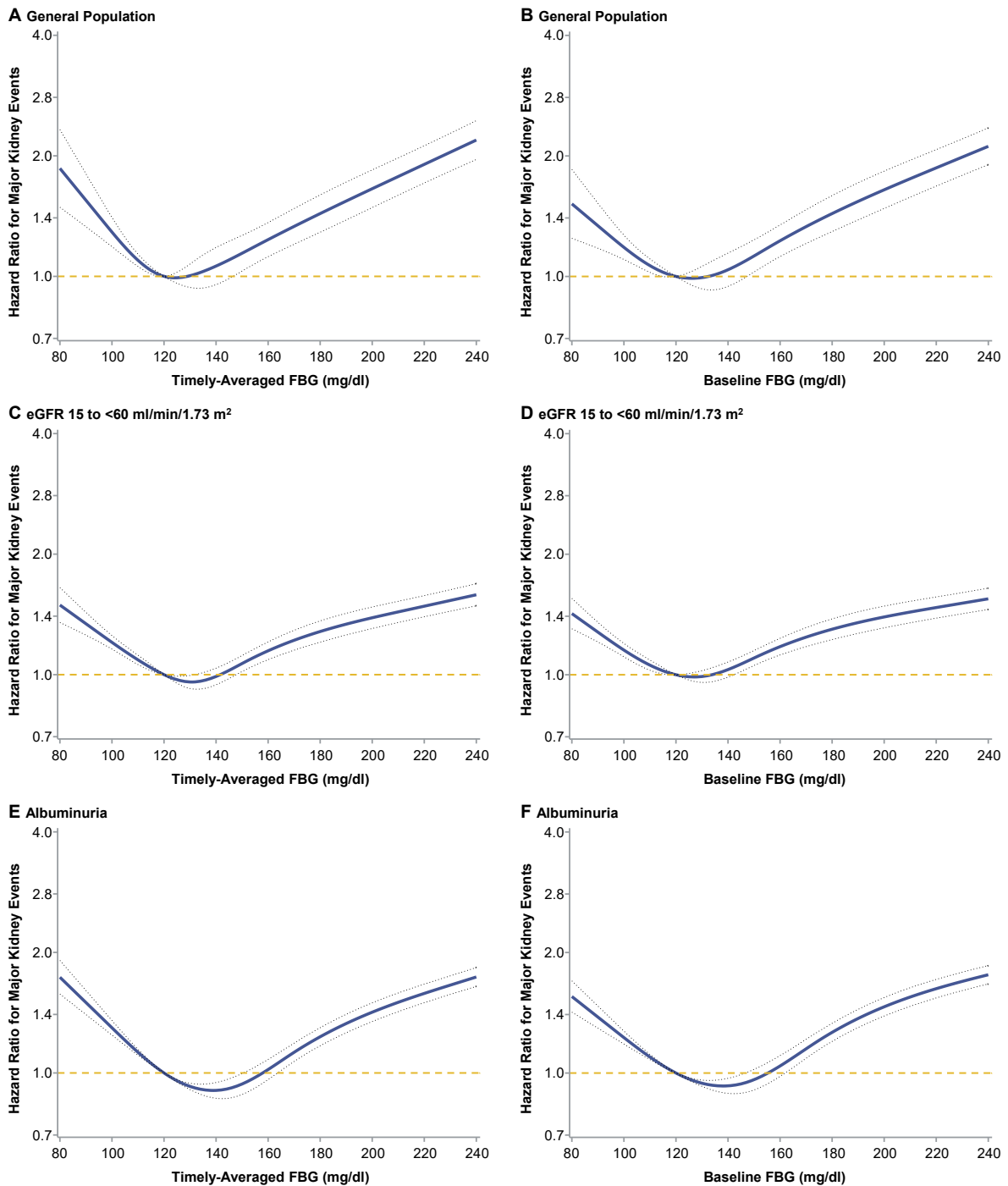
eFigure 4. Association of On-Treatment Fasting Blood Glucose Level and All-Cause Mortality by Presence or Absence of Albuminuria and Decreased Estimated Glomerular Filtration Rate

The hazard ratios (solid line) and 95% CIs (dotted line) were estimated using a restricted cubic spline function. The on-treatment FBG 120 mg/dl was set as the reference (dashed line). Analyses were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and fixed covariates of baseline age, sex, eGFR, proteinuria, time of antidiabetic initiation, antihypertensive and statin use statuses, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking. CKD G1-2 and CKD G3-4 denote CKD with an eGFR ≥ 60 ml/min/1.73 m² and CKD with an eGFR 15 to <60 ml/min/1.73 m², respectively. CKD, chronic kidney disease; FBG, fasting blood glucose.



eFigure 5. Association of On-Treatment Fasting Blood Glucose Level and Risk of Doubling Serum Creatinine Before and After Exclusion of Transient Creatinine Doubling

The hazard ratios (solid line) and 95% CIs (dotted line) were estimated using a restricted cubic spline function. The on-treatment FBG 120 mg/dl was set as the reference (dashed line). Analyses were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and fixed covariates of baseline age, sex, eGFR, proteinuria, time of antidiabetic initiation, antihypertensive and statin use statuses, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking. CKD, chronic kidney disease; FBG, fasting blood glucose.



eFigure 6. Comparison of Kidney Risks of Time-Updated and Baseline Fasting Blood Glucose Level

The hazard ratios (solid line) and 95% CIs (dotted line) were estimated using a restricted cubic spline function. The on-treatment FBG 120 mg/dl was set as the reference (dashed line). The major kidney event was a composite of doubling serum creatinine, end-stage kidney disease, or death from chronic kidney disease. Analyses were adjusted for time-varying covariates of antidiabetic use status and untreated FBG and fixed covariates of baseline age, sex, eGFR, proteinuria, time of antidiabetic initiation, antihypertensive and statin use statuses, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, body mass index, family history of cardiovascular disease, income, smoking, physical exercise, and drinking. eGFR, estimated glomerular filtration rate; FBG, fasting blood glucose.

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