SUPPLEMENTAL TABLE 1. Associations between quintiles of non-normalized (raw) biomarker concentrations and the risk of heart failure

	Events (rate per 1000 person-years)	Unadjusted	Model 1: Demographic* adjusted	Model 2: Model 1 + ACR + eGFR	Model 3: Model 2 + CVD risk factors#
KIM-1 (ng)					
≤253.4	36 (13)	Ref	Ref	Ref	Ref
>253.4-521.95	54 (20)	1.57 (1.03-2.39)	1.49 (1.98-2.28)	1.14 (0.75-1.75)	1.15 (0.74-1.79)
>521.95-918.42	68 (26)	2.01 (1.3-4.3)	1.82 (1.21-2.73)	1.25 (0.83-1.9)	1.24 (0.81-1.91)
>918.42-1675.25	84 (33)	2.57 (1.74-3.8)	2.43 (1.64-3.59)	1.52 (1.01-2.27)	1.51 (1.0-2.29)
>1675.25	91 (38)	2.9 (1.97-4.26)	2.62 (1.77-3.87)	1.3 (0.86-1.96)	1.44 (0.94-2.22)
Per SD		1.42 (1.27-1.6)	1.38 (1.23-1.55)	1.07 (0.95-1.21)	1.12 (0.98-1.28)
NGAL (mcg)					
≤1.4	46 (16)	Ref	Ref	Ref	Ref
>1.4-4.8	47 (18)	1.13 (0.75-1.7)	1.06 (0.71-1.6)	0.83 (0.55-1.26)	0.88 (0.57-1.34)
>4.8-11.8	64 (25)	1.55 (1.06-2.27)	1.42 (0.97-2.09)	0.87 (0.58-1.29)	0.89 (0.59-1.33)
>11.8-31	63 (24)	1.51 (1.03-2.21)	1.33 (0.9-1.97)	0.63 (0.42-0.95)	0.64 (0.42-0.98)
>31	113 (49)	3.03 (2.15-4.26)	2.72 (1.9-3.89)	0.8 (0.53-1.22)	0.98 (0.63-1.52)
Per SD		1.46 (1.32-1.62)	1.42 (1.28-1.58)	0.92 (0.81-1.06)	0.99 (0.86-1.14)
L-FABP (mcg)					
Undetectable	32 (14)	Ref	Ref	Ref	Ref
Below LLD (2.4)	48 (18)	1.27 (0.81-1.99)	1.3 (0.83-2.05)	1.11 (0.71-1.74)	1.16 (0.73-1.84)
> 2.4-4.90	54 (19)	1.36 (0.88-2.1)	1.35 (0.87-2.09)	1.09 (0.7-1.7)	1.09 (0.69-1.72)
> 4.90-13.57	80 (29)	2.06 (1.37-3.11)	1.98 (1.31-3.0)	1.02 (0.66-1.58)	0.93 (0.6-1.47)
> 13.57-370	120 (48)	3.4 (2.3-5.02)	3.27 (2.19-4.89)	1.05 (0.67-1.64)	1.22 (0.76-1.94)
NAG (U)					
≤0.841	37 (13)	Ref	Ref	Ref	Ref
>0.841-1.504	59 (22)	1.7 (1.12-2.56)	1.49 (0.99-2.26)	0.98 (0.64-1.49)	1.04 (0.67-1.6)
>1.504-2.549	58 (22)	1.68 (1.11-2.53)	1.5 (0.99-2.27)	0.82 (0.53-1.26)	0.98 (0.63-1.54)
>2.549-4.705	80 (32)	2.43 (1.65-3.59)	2.11 (1.42-3.12)	0.97 (0.64-1.47)	1.08 (0.7-1.66)
>4.705	99 (40)	3.06 (2.1-4.47)	2.7 (1.85-3.96)	1.2 (0.79-1.81)	1.38 (0.9-2.12)
Per SD		1.39 (1.26-1.53)	1.37 (1.24-1.52)	1.1 (0.98-1.24)	1.13 (1.0-1.27)

LLD: Lower Limit of Detection; *Demographic adjusted: age,sex,race/ ethnicity,clinical center; § ACR: albumin-creatinine ratio; #CVD risk factors: diabetes mellitus,smoking,baseline CVD,systolic and diastolic blood pressure,BMI,LDL,HDL,ACE-I: angiotensin converting enzyme inhibitor; ARB: angiotensin receptor blocker; statin,anti-platelet agents,aldosterone antagonist

SUPPLEMENTAL TABLE 2. Associations between quintiles of non-normalized (raw) biomarker concentrations and the risk of atherosclerotic CVD events

	Events (rate per 1000 person-years)	Unadjusted	Model 1: Demographic* adjusted	Model 2: Model 1 + ACR + eGFR	Model 3: Model 2 + CVD risk factors#
KIM-1 (ng)					
≤253.4	27 (10)	Ref	Ref	Ref	Ref
>253.4-521.95	43 (16)	1.64 (1.01-2.65)	1.58 (0.98-2.56)	1.34 (0.82-2.17)	1.25 (0.77-2.04)
>521.95-918.42	71 (27)	2.79 (1.79-4.35)	2.51 (1.61-3.92)	2.01 (1.28-3.15)	2.02 (1.28-3.19)
>918.42-1675.25	62 (24)	2.47 (1.57-3.89)	2.33 (1.48-3.67)	1.72 (1.08-2.74)	1.54 (0.96-2.46)
>1675.25	79 (32)	3.36 (2.17-5.19)	2.94 (1.89-4.57)	1.82 (1.14-2.88)	1.61 (1.0-2.61)
Per SD		1.53 (1.35-1.73)	1.48 (1.3-1.68)	1.25 (1.09-1.44)	1.23 (1.06-1.43)
NGAL (mcg)					
≤1.4	43 (15)	Ref	Ref	Ref	Ref
>1.4-4.8	52 (20)	1.33 (0.89-1.99)	1.29 (0.86-1.94)	1.09 (0.73-1.64)	1.24 (0.81-1.9)
>4.8-11.8	49 (19)	1.25 (0.83-1.88)	1.26 (0.83-1.9)	0.9 (0.59-1.39)	1.02 (0.66-1.59)
>11.8-31	60 (23)	1.55 (1.05-2.29)	1.57 (1.05-2.35)	0.98 (0.64-1.5)	1.24 (0.8-1.91)
>31	78 (32)	2.16 (1.49-3.13)	2.41 (1.64-3.56)	1.1 (0.7-1.72)	1.26 (0.78-2.02)
Per SD		1.31 (1.17-1.47)	1.37 (1.22-1.54)	1.05 (0.91-1.21)	1.1 (0.95-1.28)
L-FABP (mcg)					
Undetectable	30 (13)	Ref	Ref	Ref	Ref
Below LLD (2.4)	39 (15)	1.1 (0.69-1.78)	1.11 (0.69-1.79)	0.99 (0.61-1.6)	1.01 (0.62-1.64)
> 2.4-4.90	57 (19)	1.38 (0.88-2.16)	1.41 (0.89-2.21)	1.22 (0.78-1.93)	1.25 (0.78-1.99)
> 4.90-13.57	69 (25)	1.74 (1.13-2.68)	1.77 (1.14-2.73)	1.18 (0.74-1.86)	1.09 (0.68-1.75)
> 13.57-370	87 (34)	2.83 (1.88-4.27)	2.96 (1.94-4.5)	1.44 (0.89-2.33)	1.62 (0.98-2.66)
NAG (U)					
≤0.841	39 (14)	Ref	Ref	Ref	Ref
>0.841-1.504	53 (20)	1.42 (0.94-2.15)	1.29 (0.85-1.96)	0.98 (0.64-1.49)	1.04 (0.68-1.6)
>1.504-2.549	43 (16)	1.15 (0.75-1.78)	1.05 (0.68-1.62)	0.7 (0.44-1.09)	0.84 (0.53-1.33)
>2.549-4.705	70 (28)	2 (1.35-2.96)	1.76 (1.19-2.62)	1.02 (0.67-1.56)	1.07 (0.69-1.65)
>4.705	77 (31)	2.21 (1.5-3.25)	1.99 (1.35-2.95)	1.09 (0.71-1.67)	1.08 (0.69-1.68)
Per SD		n/a	n/a	n/a	n/a

LLD: Lower Limit of Detection; *Demographic adjusted: age,sex,race/ ethnicity,clinical center; § ACR: albumin-creatinine ratio; #CVD risk factors: diabetes mellitus,smoking,baseline CVD,systolic and diastolic blood pressure,BMI,LDL,HDL,ACE-I: angiotensin converting enzyme inhibitor; ARB: angiotensin receptor blocker; statin,anti-platelet agents,aldosterone antagonist

SUPPLEMENTALTABLE 3. Associations between quintiles of non-normalized (raw) biomarker concentrations and the risk of all-cause death

	Events (rate per 1000 person-years)	Unadjusted	Model 1: Demographic* adjusted	Model 2: Model 1 + ACR + eGFR	Model 3: Model 2 + CVD risk factors#
KIM-1 (ng)					
≤253.4	55 (18)	Ref	Ref	Ref	Ref
>253.4-521.95	67 (23)	1.23 (0.86-1.76)	1.2 (0.84-1.71)	1.03 (0.72-1.47)	1 (0.69-1.45)
>521.95-918.42	89 (30)	1.67 (1.2-2.34)	1.51 (1.07-2.12)	1.23 (0.87-1.73)	1.14 (0.8-1.62)
>918.42-1675.25	103 (36)	1.99 (1.43-2.76)	1.88 (1.35-2.62)	1.41 (1.01-1.98)	1.3 (0.92-1.83)
>1675.25	126 (46)	2.55 (1.86-3.5)	2.26 (1.64-3.11)	1.49 (1.06-2.09)	1.35 (0.94-1.92)
Per SD		1.38 (1.25-1.53)	1.34 (1.21-1.48)	1.15 (1.03-1.28)	1.11 (0.99-1.25)
NGAL (mcg)					
≤1.4	55 (18)	Ref	Ref	Ref	Ref
>1.4-4.8	70 (25)	1.4 (0.98-1.99)	1.3 (0.91-1.85)	1.12 (0.78-1.6)	1.21 (0.84-1.75)
>4.8-11.8	80 (27)	1.57 (1.11-2.21)	1.48 (1.05-2.1)	1.1 (0.77-1.57)	1.13 (0.78-1.64)
>11.8-31	96 (33)	1.91 (1.37-2.67)	1.81 (1.29-2.54)	1.14 (0.8-1.63)	1.23 (0.86-1.78)
>31	139 (51)	2.94 (2.15-4.02)	2.87 (2.08-3.97)	1.34 (0.92-1.94)	1.44 (0.98-2.13)
Per SD		1.46 (1.33-1.59)	1.46 (1.33-1.6)	1.13 (1.01-1.27)	1.14 (1.01-1.28)
L-FABP (mcg)					
Undetectable	48 (19)	Ref	Ref	Ref	Ref
Below LLD (2.4)	63 (22)	1.15 (0.79-1.68)	1.15 (0.79-1.68)	1.01 (0.69-1.48)	0.98 (0.67-1.44)
> 2.4-4.90	93 (30)	1.61 (1.13-2.28)	1.54 (1.08-2.18)	1.33 (0.93-1.89)	1.33 (0.92-1.91)
> 4.90-13.57	93 (30)	1.61 (1.14-2.28)	1.5 (1.05-2.14)	0.96 (0.66-1.39)	0.86 (0.59-1.26)
> 13.57-370	143 (48)	2.58 (1.86-3.58)	2.4 (1.72-3.37)	1.08 (0.74-1.57)	1.04 (0.7-1.54)
NAG (U)					
≤0.841	54 (18)	Ref	Ref	Ref	Ref
>0.841-1.504	79 (27)	1.5 (1.06-2.12)	1.32 (0.93-1.87)	1.02 (0.71-1.45)	1.08 (0.75-1.54)
>1.504-2.549	91 (31)	1.75 (1.25-2.46)	1.6 (1.14-2.25)	1.08 (0.76-1.54)	1.11 (0.77-1.59)
>2.549-4.705	97 (34)	1.93 (1.38-2.69)	1.65 (1.18-2.32)	1.01 (0.71-1.44)	1.07 (0.74-1.54)
>4.705	119 (42)	2.36 (1.71-3.25)	2.12 (1.53-2.93)	1.31 (0.92-1.87)	1.2 (0.83-1.73)
Per SD		1.27 (1.16-1.38)	1.25 (1.15-1.37)	1.1 (0.99-1.22)	1.05 (0.95-1.17)

LLD: Lower Limit of Detection; *Demographic adjusted: age,sex,race/ ethnicity,clinical center; § ACR: albumin-creatinine ratio; #CVD risk factors: diabetes mellitus,smoking,baseline CVD,systolic and diastolic blood pressure,BMI,LDL,HDL,ACE-I: angiotensin converting enzyme inhibitor; ARB: angiotensin receptor blocker; statin,anti-platelet agents,aldosterone antagonist

SUPPLEMENTAL TABLE 4. Associations between quintiles of inverse of urine creatinine and outcomes

	Unadjusted	Model 1: Demographic* adjusted	Model 2: Model 1 + ACR + eGFR	Model 3: Model 2 + CVD risk factors#
Heart failure				
≤1.09	Ref	Ref	Ref	Ref
>1.09-1.69	1.30 (0.90-1.88)	1.32 (0.91-1.91)	1.07 (0.74-1.55)	0.94 (0.64-1.39)
>1.69-2.41	1.54 (1.08-2.20)	1.53 (1.06-2.21)	1.08 (0.75-1.56)	0.94 (0.64-1.38)
>2.41-3.98	1.81 (1.28-2.56)	1.89 (1.32-2.71)	1.29 (0.89-1.85)	1.17 (0.8-1.71)
>3.98	1.28 (0.88-1.86)	1.39 (0.93-2.05)	0.91 (0.61-1.36)	0.80 (0.53-1.23)
Per SD	1.10 (0.99-1.22)	1.12 (1.00-1.25)	1.00 (0.89-1.13)	0.97 (0.85-1.1)
Atherosclerotic CVD events				
≤1.09	Ref	Ref	Ref	Ref
>1.09-1.69	0.98 (0.67-1.43)	1.01 (0.69-1.48)	0.88 (0.6-1.29)	0.87 (0.58-1.31)
>1.69-2.41	1.19 (0.83-1.72)	1.24 (0.86-1.80)	1.00 (0.69-1.45)	1.03 (0.69-1.52)
>2.41-3.98	1.26 (0.88-1.80)	1.43 (0.99-2.07)	1.08 (0.74-1.58)	1.10 (0.74-1.64)
>3.98	0.93 (0.63-1.37)	1.15 (0.76-1.72)	0.88 (0.58-1.34)	0.79 (0.51-1.23)
Per SD	0.97 (0.86-1.09)	1.03 (0.91-1.17)	0.95 (0.83-1.08)	0.90 (0.78-1.04)
Death				
≤1.09	Ref	Ref	Ref	Ref
>1.09-1.69	1.39 (1.02-1.89)	1.41 (1.03-1.93)	1.20 (0.88-1.64)	1.22 (0.88-1.68)
>1.69-2.41	1.32 (0.97-1.81)	1.29 (0.94-1.78)	0.98 (0.71-1.36)	0.96 (0.69-1.35)
>2.41-3.98	1.47 (1.08-1.99)	1.58 (1.15-2.16)	1.13 (0.82-1.56)	1.19 (0.85-1.66)
>3.98	1.38 (1.01-1.89)	1.56 (1.12-2.17)	1.15 (0.82-1.61)	1.14 (0.80-1.63)
Per SD	1.09 (0.99-1.19)	1.13 (1.02-1.24)	1.04 (0.94-1.15)	1.04 (0.93-1.15)

LLD: Lower Limit of Detection; *Demographic adjusted: age,sex,race/ ethnicity,clinical center; § ACR: albumin-creatinine ratio; #CVD risk factors: diabetes mellitus,smoking,baseline CVD,systolic and diastolic blood pressure,BMI,LDL,HDL,ACE-I: angiotensin converting enzyme inhibitor; ARB: angiotensin receptor blocker; statin,anti-platelet agents,aldosterone antagonists

Supplemental Figure 1a. Distribution of eGFR and ACR by quintiles of KIM-1/Cr.
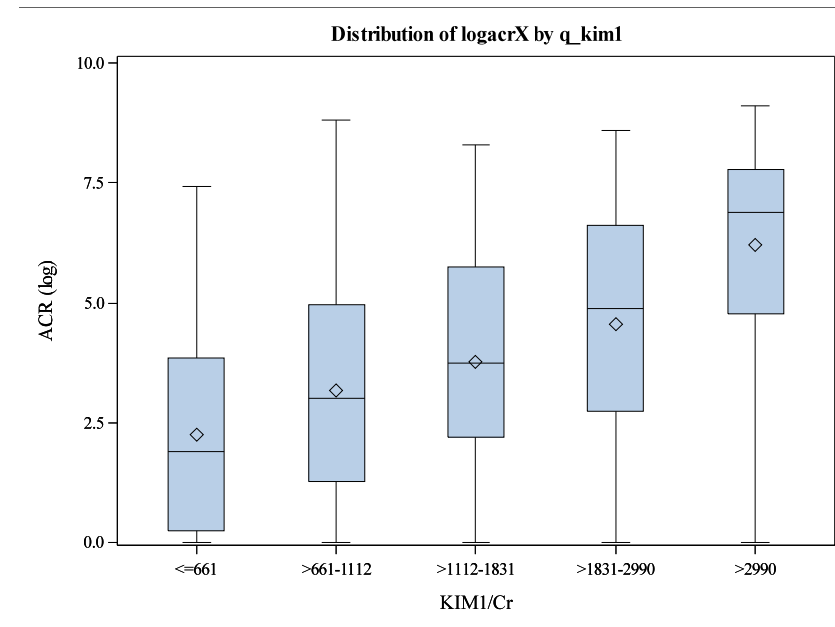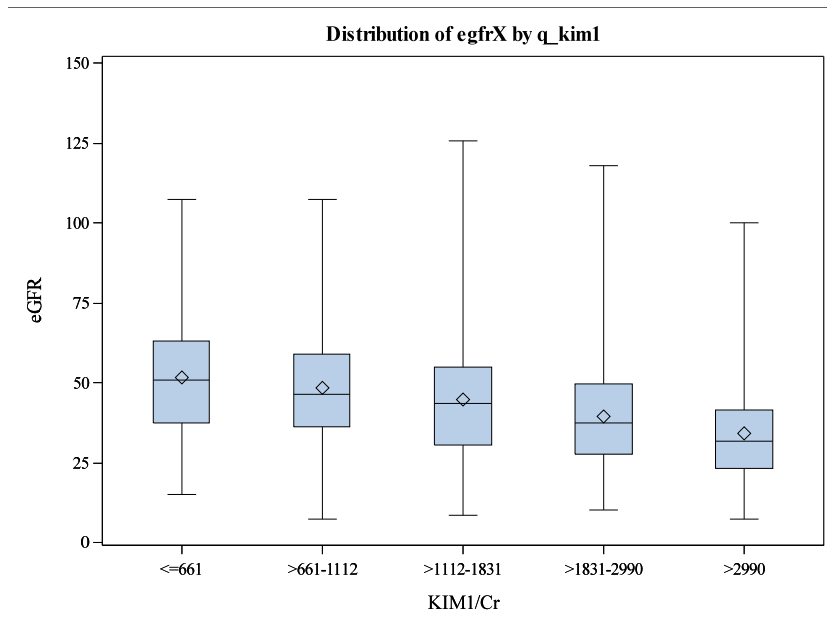
Supplemental Figure 1b. Distribution of eGFR and ACR by quintiles of NGAL/Cr.
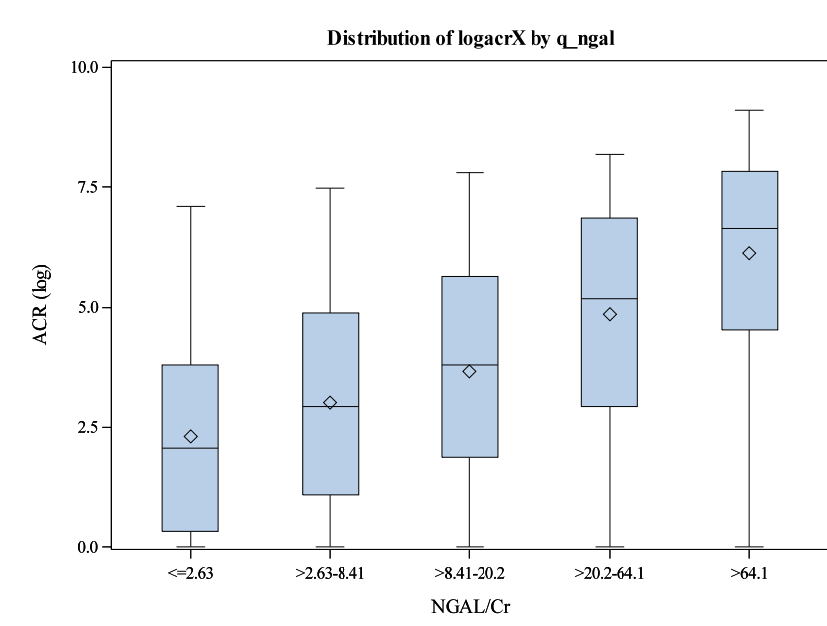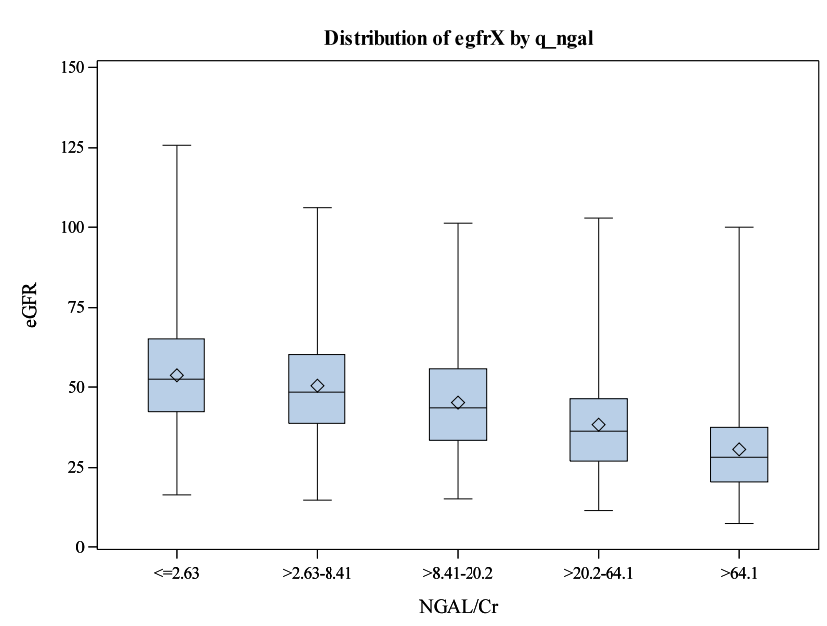
Supplemental Figure 1c. Distribution of eGFR and ACR by measurable quartiles of LFABP/Cr.
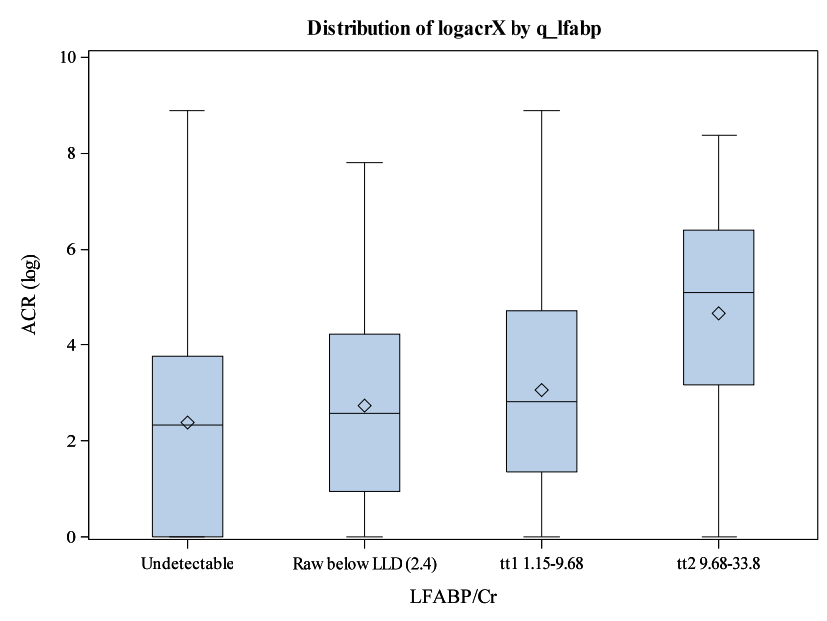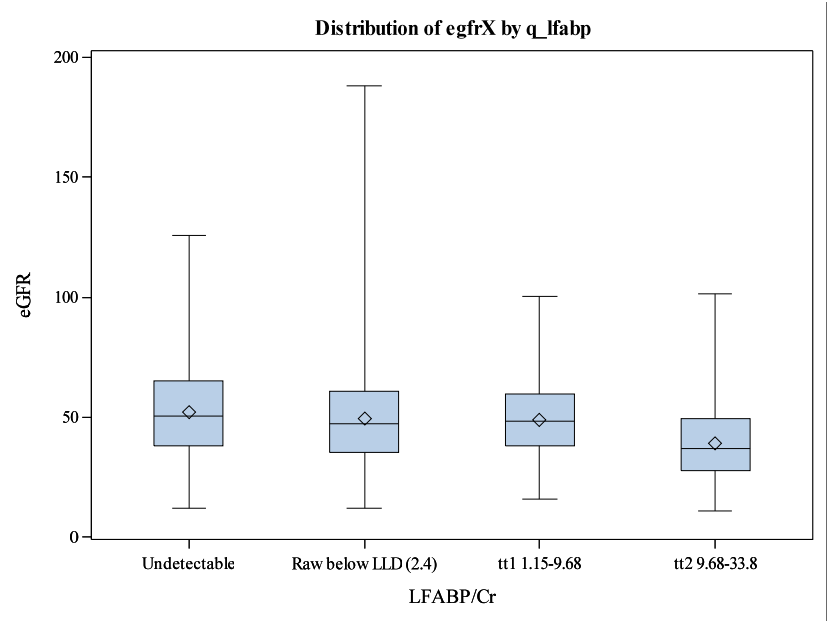
Supplemental Figure 1d. Distribution of eGFR and ACR by quintiles of NAG/Cr.
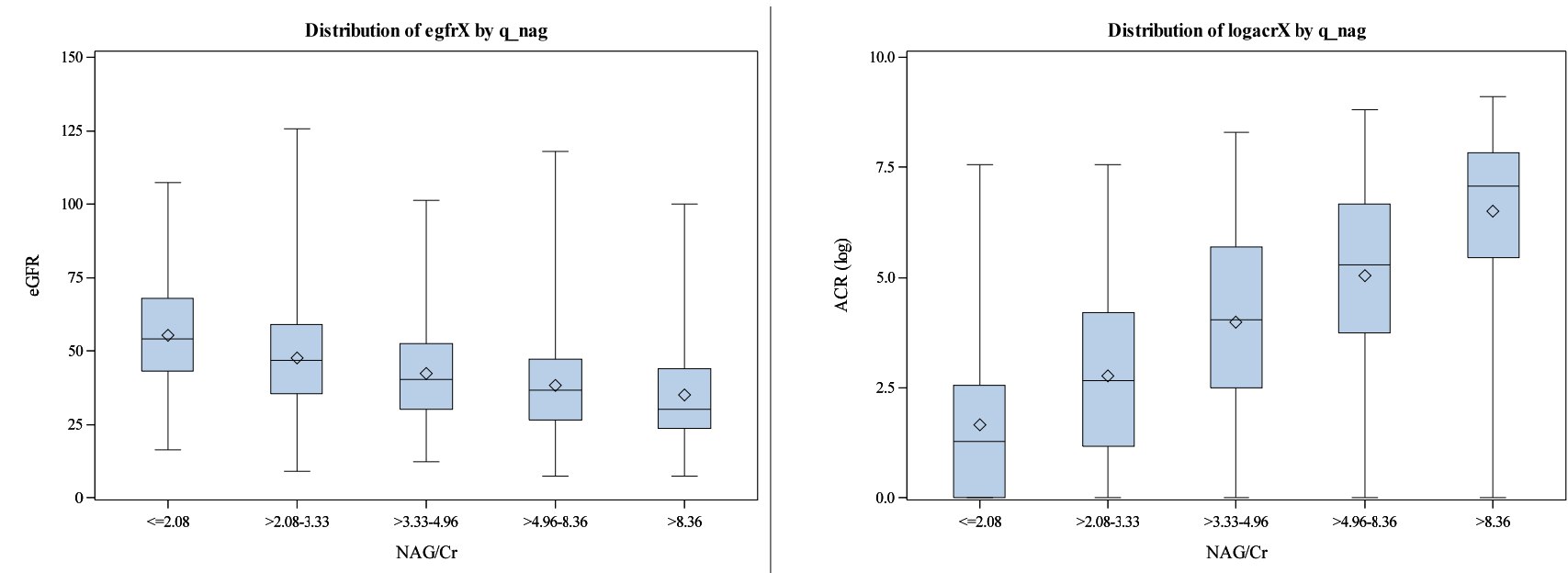
Supplemental Figure 2a. Spline relationship between KIM-1/Cr and Heart Failure.
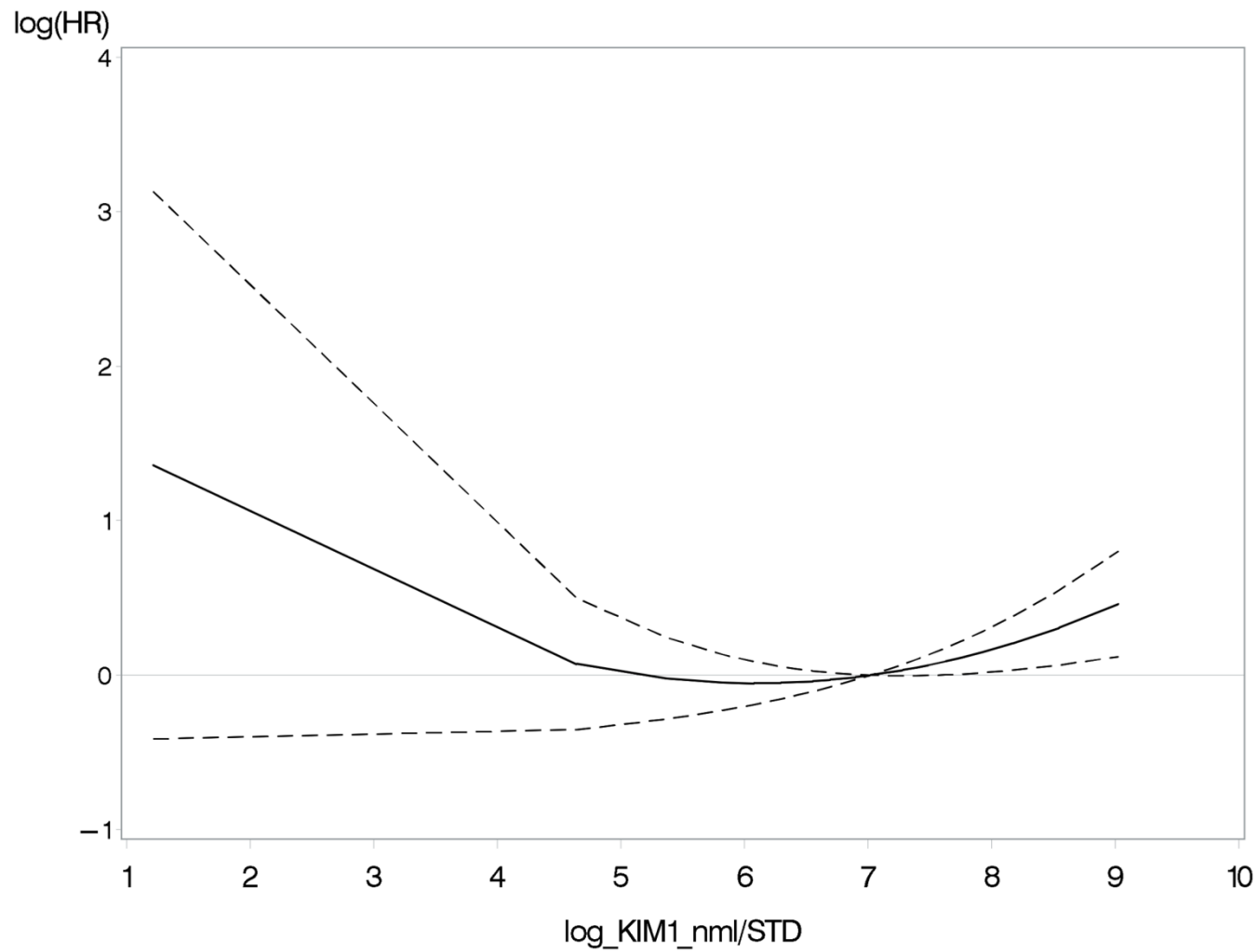
Supplemental Figure 2b. Spline relationship between NAG/Cr and Heart Failure.
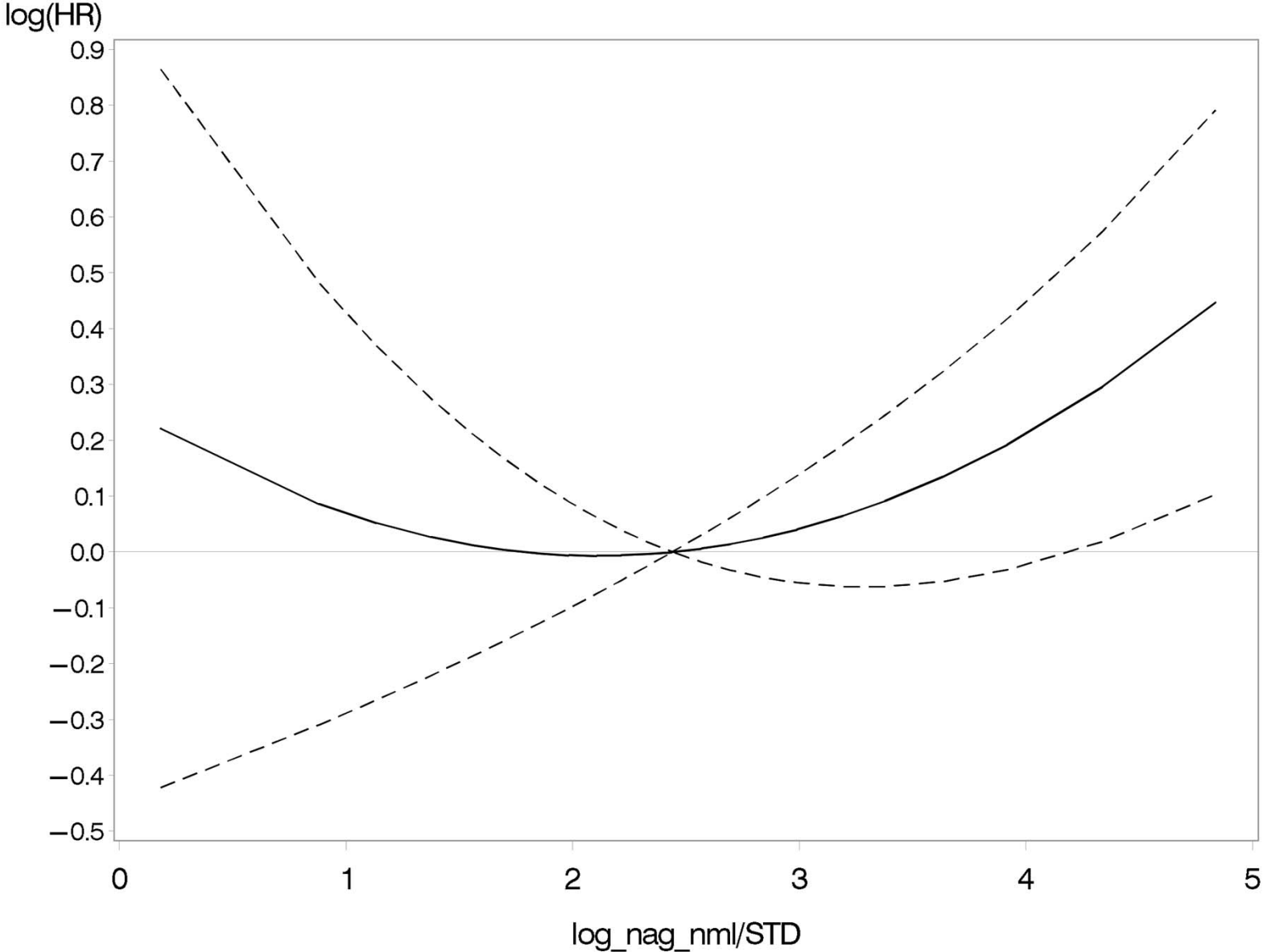
Supplemental Figure 2c. Spline relationship between NAG/Cr and Atherosclerotic Events.
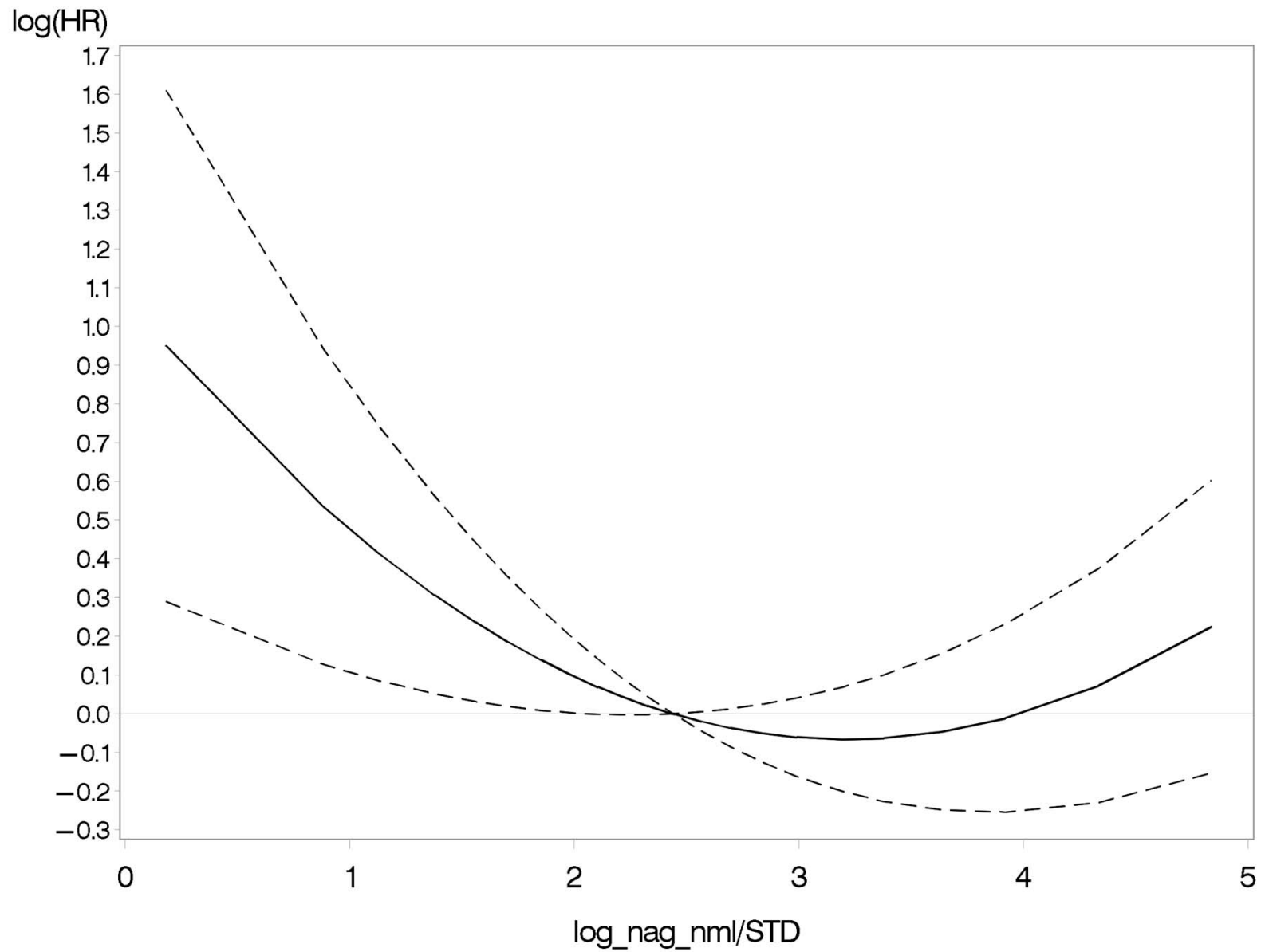
Supplemental Figure 2d. Spline relationship between NAG (non-normalized) and Atherosclerotic Events.