

## SUPPLEMENTARY DATA

### Online-Only Supplement

**Supplementary To:** Schneider ALC, Kalyani RR, Golden S, Stearns SC, Wruck L, Yeh HC, Coresh J, Selvin E. Diabetes and Pre-diabetes in Mid-life and Risk of Hospitalization: the Atherosclerosis Risk in Communities (ARIC) Study.

### Table of Contents

	Page
Supplementary Table 1. Demographic and Charlson Comorbidity Index adjusted rates of all-cause hospitalization per 1,000 person-years (95% confidence intervals) by baseline (1990-1992) diabetes and HbA1c category from negative binomial models, the ARIC study, 1990-2011.	2
Supplementary Table 2. Multivariable adjusted rates of all-cause hospitalization per 1,000 person-years (95% confidence intervals) by baseline (1990-1992) diabetes and HbA1c category from negative binomial models, the ARIC study, 1990-2011.	3
Supplementary Table 3. Demographic adjusted rates of all-cause hospitalization per 1,000 person-years (95% confidence intervals) by baseline (1990-1992) diabetes and HbA1c category (using HbA1c cutpoint of 8.0% among those with diagnosed diabetes) from negative binomial models, the ARIC study, 1990-2011.	4
Supplementary Table 4. Demographic adjusted rates of all-cause hospitalization per 1,000 person-years (95% confidence interval) by baseline (1990-1992) diabetes and HbA1c category from zero-inflated negative binomial models, the ARIC study, 1990-2011.	5
Supplementary Table 5. Demographic adjusted rates of all-cause hospitalization per 1,000 person-years (95% confidence interval) by baseline (1990-1992) diabetes and fasting glucose category from negative binomial models, the ARIC study, 1990-2011.	6
Supplementary Table 6. Most common primary cause for hospitalization and crude cause-specific rates per 1,000 person-years by baseline (1990-1992) diabetes status, the ARIC study, 1990-2011.	7
Supplementary Figure 1 Legend: Crude number of all-cause hospitalizations by baseline (1990-1992) diabetes and HbA1c category over a median of 20 years of follow-up, the ARIC Study, 1990-2011.	9

SUPPLEMENTARY DATA

**Supplementary Table 1.** Demographic and Charlson Comorbidity Index adjusted\* rates of all-cause hospitalization per 1,000 person-years (95% confidence intervals) by baseline (1990-1992) diabetes and HbA1c category from negative binomial models, the ARIC study, 1990-2011.

	No History of Diagnosed Diabetes			Diagnosed Diabetes	
	HbA1c <5.7%	HbA1c 5.7-<6.5%	HbA1c ≥6.5%	HbA1c <7.0%	HbA1c ≥7.0%
<b>Overall</b>	163 (158-168)	217 (205-228)**	254 (225-281)**	331 (290-373)**	493 (453-533)**†
<b>By Race</b>					
White	161 (156-166)	229 (208-237)**	260 (223-298)**	292 (246-339)**	461 (414-508)**†
Black	170 (155-185)	210 (192-228)**	253 (212-294)**	416 (336-496)**	543 (475-612)**†
<b>By Sex</b>					
Men	186 (177-194)	248 (231-266)**	275 (228-322)**	384 (308-461)**	469 (416-522)**†
Women	146 (140-153)	194 (180-208)**	236 (203-270)**	295 (248-341)**	508 (450-565)**†
<b>By Baseline Age</b>					
≤55 Years	117 (111-123)	159 (145-173)**	178 (144-212)**	258 (200-316)**	370 (318-422)**†
>55 Years	209 (201-218)	270 (254-287)**	328 (285-370)**	397 (339-454)**	592 (535-650)**†

\*Adjusted for age, sex, race/center, insurance status, and Charlson Comorbidity Index.

\*\* P<0.05, compared to HbA1c <5.7% (reference).

†P<0.05, HbA1c ≥7.0% versus HbA1c <7.0% (reference).

SUPPLEMENTARY DATA

**Supplementary Table 2.** Multivariable adjusted\* rates of all-cause hospitalization per 1,000 person-years (95% confidence intervals) by baseline (1990-1992) diabetes and HbA1c category from negative binomial models, the ARIC study, 1990-2011.

	No History of Diagnosed Diabetes			Diagnosed Diabetes	
	HbA1c <5.7%	HbA1c 5.7-<6.5%	HbA1c ≥6.5%	HbA1c <7.0%	HbA1c ≥7.0%
<b>Overall</b>	164 (159-169)	186 (176-195)**	201 (180-222)**	258 (228-287)**	366 (336-395)**†
<b>By Race</b>					
White	160 (156-165)	184 (173-196)**	193 (167-220)**	219 (189-248)**	331 (297-366)**†
Black	174 (159-189)	194 (177-210)	220 (186-255)**	348 (279-416)**	428 (279-416)**†
<b>By Sex</b>					
Men	186 (178-194)	213 (198-227)**	229 (193-266)**	302 (251-352)**	364 (322-406)**†
Women	148 (141-154)	165 (153-177)**	184 (158-208)**	227 (191-263)**	367 (325-408)**†
<b>By Baseline Age</b>					
≤55 Years	117 (111-123)	132 (120-144)**	132 (108-155)	200 (157-242)**	279 (239-318)**†
>55 Years	212 (204-220)	239 (225-253)**	273 (238-308)**	319 (276-361)**	452 (408-495)**†

\*Adjusted for age, sex, race/center, education, income, insurance status, body-mass index, smoking, alcohol consumption, systolic and diastolic blood pressure, hypertension medication use, coronary heart disease, total and high-density lipoprotein cholesterol, cholesterol medication use, and estimated glomerular filtration rate.

\*\* P<0.05, compared to HbA1c <5.7% (reference).

†P<0.05, HbA1c ≥7.0% versus HbA1c <7.0% (reference).

SUPPLEMENTARY DATA

**Supplementary Table 3.** Demographic adjusted\* rates of all-cause hospitalization per 1,000 person-years (95% confidence intervals) by baseline (1990-1992) diabetes and HbA1c category (using HbA1c cutpoint of 8.0% among those with diagnosed diabetes) from negative binomial models, the ARIC study, 1990-2011.

	No History of Diagnosed Diabetes			Diagnosed Diabetes	
	HbA1c <5.7% (n=9,267)	HbA1c 5.7-<6.5% (n=2,441)	HbA1c ≥6.5% (n=553)	HbA1c <8.0% (n=655)	HbA1c ≥8.0% (n=606)
<b>Overall</b>	163 (158-168)	217 (206-228)**	254 (226-281)**	359 (322-397)**	548 (497-601)**†
<b>By Race</b>					
White	161 (156-167)	223 (209-238)**	263 (225-302)**	320 (281-360)**	529 (46-597)**†
Black	170 (155-185)	200 (191-227)**	251 (211-291)**	440 (360-520)**	580 (502-658)**†
<b>By Sex</b>					
Men	186 (178-195)	248 (230-266)**	279 (231-327)**	382 (324-440)**	546 (471-622)**†
Women	146 (140-153)	195 (180-209)**	236 (202-269)**	347 (297-396)**	541 (474-610)**†
<b>By Baseline Age</b>					
≤55 Years	118 (111-124)	163 (148-178)**	181 (145-217)**	274 (221-326)**	464 (391-538)**†
>55 Years	209 (201-218)	270 (254-287)**	320 (288-372)**	447 (393-501)**	635 (563-706)**†

\*Adjusted for age, sex, race/center, and insurance status.

\*\* P<0.05, compared to HbA1c <5.7% (reference).

†P<0.05, HbA1c ≥8.0% versus HbA1c <8.0% (reference).

SUPPLEMENTARY DATA

**Supplementary Table 4.** Demographic adjusted\* rates of all-cause hospitalization per 1,000 person-years (95% confidence interval) by baseline (1990-1992) diabetes and HbA1c category from zero-inflated negative binomial models, the ARIC study, 1990-2011.

	No History of Diagnosed Diabetes			Diagnosed Diabetes	
	HbA1c <5.7%	HbA1c 5.7-<6.5%	HbA1c ≥6.5%	HbA1c <7.0%	HbA1c ≥7.0%
<b>Overall</b>	166 (159-172)	217 (206-229)**	259 (226-293)**	341 (297-384)**	511 (464-557)**†
<b>By Race</b>					
White	162 (156-169)	224 (210-238)**	263 (225-302)**	301 (251-350)**	483 (431-535)**†
Black	174 (158-190)	210 (191-229)**	259 (213-305)**	434 (348-521)**	554 (483-626)**†
<b>By Sex</b>					
Men	189 (180-198)	248 (231-266)**	281 (232-330)**	401 (319-484)**	481 (424-537)**†
Women	149 (141-156)	195 (180-210)**	2453(207-279)**	302 (254-350)**	524 (462-586)**†
<b>By Baseline Age</b>					
≤55 Years	118 (112-124)	163 (148-178)**	181 (145-217)**	280 (215-346)**	416 (356-476)**†
>55 Years	211 (203-219)	270 (253-287)**	329 (287-371)**	405 (345-465)**	599 (539-658)**†

\*Adjusted for age, sex, race/center, and insurance status.

\*\* P<0.05, compared to HbA1c <5.7% (reference).

†P<0.05, HbA1c ≥7.0% versus HbA1c <7.0% (reference).

SUPPLEMENTARY DATA

**Supplementary Table 5.** Demographic adjusted\* rates of all-cause hospitalization per 1,000 person-years (95% confidence interval) by baseline (1990-1992) diabetes and fasting glucose category from negative binomial models, the ARIC study, 1990-2011.

	No History of Diagnosed Diabetes			Diagnosed Diabetes	
	Fasting Glucose <100 mg/dl	Fasting Glucose 100-<126 mg/dl	Fasting Glucose ≥126 mg/dl	Fasting Glucose <150 mg/dl	Fasting Glucose ≥150 mg/dl
<b>Overall</b>	167 (160-174)	181 (174-188)**	221 (203-240)**	381 (328-433)**	472 (433-510)**†
<b>By Race</b>					
White	163 (155-170)	177 (170-185)**	225 (202-248)**	332 (276-389)**	445 (398-492)**†
Black	183 (165-201)	192 (176-209)	222 (191-254)**	491 (377-604)**	531 (467-595)**
<b>By Sex</b>					
Men	203 (189-217)	200 (191-210)	232 (206-258)**	463 (367-559)**	436 (388-484)**
Women	144 (137-152)	168 (159-178)**	216 (190-243)**	328 (269-388)**	495 (440-549)**†
<b>By Baseline Age</b>					
≤55 Years	117 (109-124)	131 (123-140)**	174 (148-199)**	301 (228-374)**	396 (340-452)**†
>55 Years	220 (207-232)	231 (222-241)	270 (243-296)**	463 (389-538)**	556 (503-609)**

\*Adjusted for age, sex, race/center, and insurance status.

\*\* P<0.05, compared to fasting glucose <100 mg/dl (reference).

†P<0.05, fasting glucose ≥150 mg/dl versus fasting glucose <150 mg/dl (reference).

SUPPLEMENTARY DATA

**Supplementary Table 6.** Most common primary cause for hospitalization and crude cause-specific rates per 1,000 person-years by baseline (1990-1992) diabetes status, the ARIC study, 1990-2011.

No History of Diagnosed Diabetes (35,861 hospitalizations among n=12,261 participants)		Diagnosed Diabetes (7,211 hospitalizations among 1,261 participants)	
Primary Cause of Hospitalization	Rate (95% CI) per 1,000 PY	Primary Cause of Hospitalization	Rate (95% CI) per 1,000 PY
<b>1 Cardiovascular:</b>	<b>63.9 (62.9-65.0)</b>	<b>1 Cardiovascular:</b>	<b>174.9 (169.5-180.4)</b>
1.1 Coronary atherosclerosis	12.4 (11.9-12.8)	1.1 Congestive heart failure	35.8 (33.2-38.5)
1.2 Cardiac dysrhythmias	7.8 (7.3-8.0)	1.2 Coronary atherosclerosis	32.6 (30.2-35.3)
1.3 Nonhypertensive congestive heart failure	6.2 (5.9-6.6)	1.3 Hypertension with complications	18.3 (16.5-20.3)
<b>2 Gastrointestinal:</b>	<b>15.6 (15.1-16.1)</b>	<b>2 Endocrine:</b>	<b>53.1 (50.0-56.4)</b>
2.1 Biliary tract disease	3.0 (2.8-3.3)	2.1 Diabetes mellitus with complications	32.0 (29.6-34.7)
2.2 Diverticulosis/diverticulitis	1.8 (1.7-2.0)	2.2 Diabetes mellitus without complications	13.5 (11.9-15.2)
2.3 Gastrointestinal hemorrhage	1.8 (1.6-2.0)	2.3 Fluid and electrolyte disorders	5.1 (4.2-6.3)
<b>3-Neoplasm:</b>	<b>15.3 (14.8-15.9)</b>	<b>3 Respiratory:</b>	<b>26.6 (24.4-29.0)</b>
3.1 Secondary malignancies	1.9 (1.7-2.1)	3.1 Pneumonia	8.7 (7.5-10.1)
3.2 Maintenance chemotherapy/radiotherapy	1.6 (1.4-1.7)	3.2 Chronic obstructive pulmonary disease	3.8 (3.0-4.8)
3.3 Lung cancer	1.5 (1.4-1.7)	3.3 Respiratory failure	3.7 (2.9-4.7)
<b>4 Musculoskeletal:</b>	<b>13.6 (13.2-14.1)</b>	<b>4 Gastrointestinal:</b>	<b>25.2 (23.1-27.6)</b>
4.1 Osteoarthritis	6.5 (6.1-6.8)	4.1 Gastrointestinal hemorrhage	4.4 (3.5-5.5)
4.2 Spondylosis	4.0 (3.7-4.2)	4.2 Biliary tract disease	4.0 (3.2-5.0)
4.3 Other connective tissue disease	1.1 (1.0-1.3)	4.3 Esophageal disorders	2.1 (1.5-2.9)
<b>5 Respiratory:</b>	<b>13.1 (12.6-13.6)</b>	<b>5 Iatrogenic/Injury:</b>	<b>23.3 (21.2-25.6)</b>
5.1 Pneumonia	4.6 (4.3-4.9)	5.1 Complications of device/implant/graft	8.8 (7.5-10.2)
5.2 Chronic obstructive pulmonary disease	3.0 (2.8-3.2)	5.2 Complications of surgical procedures	4.7 (3.8-5.8)
5.3 Respiratory failure	1.4 (1.2-1.6)	5.3 Fracture of neck of femur (hip)	2.4 (1.8-3.2)
<b>6 Iatrogenic/Injury:</b>	<b>10.8 (10.4-11.3)</b>	<b>6 Neoplasm:</b>	<b>18.1 (16.3-20.1)</b>
6.1 Complications of device/implant/graft	2.8 (2.6-3.0)	6.1 Secondary malignancies	2.5 (1.6-3.3)
6.2 Complications of surgical procedures	2.2 (2.0-2.4)	6.2 Breast cancer	1.9 (1.4-2.7)
6.3 Fracture of neck of femur (hip)	1.1 (0.9-1.2)	6.3 Maintenance chemotherapy/radiotherapy	1.8 (1.3-2.6)
<b>7 Genitourinary:</b>	<b>8.4 (8.1-8.8)</b>	<b>7 Genitourinary:</b>	<b>14.9 (13.3-16.8)</b>
7.1 Urinary tract infection	1.6 (1.5-1.8)	7.1 Acute renal failure	5.1 (4.1-6.2)
7.2 Prolapse of female genital organs	1.3 (1.2-1.5)	7.2 Urinary tract infection	4.3 (3.5-5.4)
7.3 Acute renal disease	1.2 (1.1-1.4)	7.3 Calculus of urinary tract	1.1 (0.7-1.7)

SUPPLEMENTARY DATA

<b>8 Endocrine:</b>	<b>5.5 (5.2-5.8)</b>	<b>8 Musculoskeletal:</b>	<b>12.8 (11.3-14.5)</b>
8.1 Fluid and electrolyte disorders	1.8 (1.6-2.0)	8.1 Spondylosis	4.5 (3.6-5.6)
8.2 Diabetes mellitus without complications	1.4 (1.3-1.6)	8.2 Osteoarthritis	4.4 (3.5-5.4)
8.3 Diabetes mellitus with complications	1.2 (1.1-1.4)	8.3 Other connective tissue disease	1.7 (1.2-2.4)
<b>9 Neurologic:</b>	<b>3.4 (3.1-3.6)</b>	<b>9 Neurologic:</b>	<b>7.0 (5.9-8.3)</b>
9.1 Other nervous system disorders	0.8 (0.6-0.9)	9.1 Epilepsy; seizures	1.2 (0.8-1.8)
9.2 Conditions associated with dizziness	0.6 (0.4-0.7)	9.2 Other nervous system disorders	1.1 (0.7-1.7)
9.3 Epilepsy; seizures	0.5 (0.4-0.6)	9.3 Other eye disorders	0.6 (0.4-1.2)
<b>10 Infection:</b>	<b>2.6 (2.4-2.8)</b>	<b>10 Infection:</b>	<b>6.8 (5.7-8.1)</b>
10.1 Sepsis	2.0 (1.8-2.2)	10.1 Sepsis	5.7 (4.7-6.9)
10.2 Viral infection	0.2 (0.1-0.3)	10.2 Fungal infection	0.4 (0.2-0.9)
10.3 Fungal infection	0.1 (0.09-0.2)	10.3 Viral infection	0.4 (0.2-0.8)

Note: Table shows the 10 most common body systems diagnoses and the 3 most common disease diagnoses within each body system.



SUPPLEMENTARY DATA

**Supplementary Figure 1.** Crude number of all-cause hospitalizations by baseline (1990-1992) diabetes and HbA1c category over a median of 20 years of follow-up, the ARIC Study, 1990-2011.

